Contamination Assessment - Allied Asphalt Plant

Prepared for Allied Asphalt Limited
Prepared by Beca Limited

6 April 2023

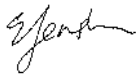
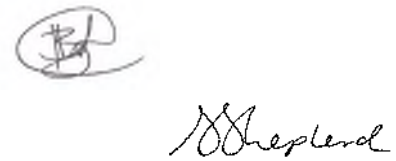
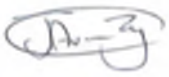
Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Emily Fensham	Draft	04/04/2023
2	Curtis Blyth	Final	06/04/2023

Document Acceptance

Action	Name	Signed	Date
Prepared by	Emily Fensham		06/04/2023
Reviewed by	Curtis Blyth & Sarah Shepherd (CEnvP(SC))		06/04/2023
Approved by	Jandre van Zyl		06/04/2023
on behalf of	Beca Limited		

This report has been reviewed by Sarah Shepherd, CEnvP Site Contamination Specialist. Sarah is a suitably qualified and experienced practitioner (SQEP) with over 17 years of experience managing and delivering a wide variety of environmental investigation works in New Zealand, Asia and the United Kingdom. She is experienced in regulatory compliance, oversight of environmental investigations, monitoring and risk assessment, contractor management, preparation and review of technical reports, as well as consultation with stakeholders and regulatory bodies. Sarah has been a Certified Environmental Practitioner Site Contamination Specialist since 2016.

Executive Summary

Beca Ltd (Beca) has been commissioned by Allied Asphalt Limited (Allied Asphalt) to undertake a high-level contaminated land assessment with regards to their proposed asphalt plant upgrades (the 'project') at 54 Aerodrome Road, Mt Maunganui (the site).

The purpose of this investigation is to undertake a screening exercise for potential contaminants in the soil and groundwater located at the site, and in particular, assess whether poly- and perfluorinated alkyl substances (PFAS) may be present in groundwater ahead of potential dewatering for the project.

A Preliminary Site Investigation[1] has been completed by Beca which identified the following Hazardous Activity and Industry List (HAIL) activities being relevant to the site on a 'more likely than not' basis:

- E2 (*Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant*)) – associated with primary use of the site as an asphalt plant.
- A17 (*Storage tanks or drums for fuel, chemicals or liquid waste*) – associated with the storage of hydrocarbons and other smaller volume chemicals throughout the site associated with the asphalt manufacture process.
- A18 (*Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside*) – associated with historical use of the front portion of the 54 Aerodrome Road property for timber treatment and storage.

Soil sampling was undertaken on 31 January 2023, with samples collected from a range of depths during the drilling of two boreholes and installation of piezometers within the site. These piezometers were installed to ~4.8m below ground level, and enabled the collection of groundwater samples over two sampling rounds undertaken on 21 February and 2 March 2023.

The following contaminants were selected for analysis in both soil and groundwater samples to provide an indication of potential contamination:

- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)
- PFAS
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAH)
- Total petroleum hydrocarbons (TPH)

No visual or olfactory signs of contamination were observed in the soil core from drilling. Similarly, groundwater extracted contained no free product, was clear, and contained no olfactory indications of contamination.

Analysis of four soil samples found detectable concentrations of heavy metals in both boreholes at concentrations below published regional background criteria. Two soil samples were found to contain low concentrations of TPH below the adopted assessment criteria. All other contaminants (BTEX, PAH and PFAS) were below laboratory detection limits in all four soil samples.

Analysis of groundwater samples from the two sampling events found concentrations of heavy metals below the adopted guidelines. One of the two samples from BH02 contained a low concentration of perfluorooctanoic acid (PFOA), however this result was below the adopted assessment criteria. All other contaminants (BTEX, PAH and TPH) were below laboratory detection limits in all four groundwater samples.

[1] *Preliminary Site Investigation (Contaminated Land) – Allied Asphalt, Aerodrome Road – Asphalt Plant Upgrades*. Prepared by Beca, November 2022.

No contaminants assessed in this investigation have been identified in soil and groundwater at concentrations that would present a risk to human health or the environment during the construction of the project.

Despite the low risk identified in the investigation, a Contaminated Site Management Plan[2] (CSMP) has been prepared on a precautionary basis given on the limited extent of this investigation and inability to fully characterise the site's contamination status. This investigation report and CSMP is to assist resource consent application. The CSMP includes handling procedures, PPE requirements, dewatering protocol, sampling requirements for offsite disposal and accidental discovery protocol that will adequately manage the potential risks posed by contaminants within this site.

[2] Contaminated Site Management Plan – Asphalt Plant Upgrades – Aerodrome Road. Beca, 2023.

1 Introduction

Beca Ltd (Beca) has been commissioned by Allied Asphalt Limited (Allied Asphalt) to undertake a high-level contaminated land assessment of their Asphalt Plant at 54 Aerodrome Road, Mount Maunganui (the site). Allied Asphalt propose to upgrade their Asphalt Plant (the 'project'), involving reconfiguration of their site and minor earthworks associated with structure foundations and service connections.

1.1 Background

A Preliminary Site Investigation[3] (PSI) for the site was undertaken by Beca in 2022. The PSI identified Hazardous Activities and Industries List (HAIL) category E2 - asphalt or bitumen manufacture or bulk storage and the auxiliary category A17 - chemical and fuel storage associated with the asphalt manufacture process have occurred on the site, as well as HAIL A18 - Wood treatment, preservation or bulk storage associated with the historic use of the neighbouring property along the site's eastern boundary for timber treatment processes.

Following design completion, it was understood that the stormwater upgrades associated with the project would require localised dewatering due to the high water table. The wider Mount Maunganui industrial zone is known to have poly- and perfluorinated alkyl substance (PFAS) contamination associated with a long history of various industrial uses. It was requested by Allied Asphalt to undertake a groundwater assessment to inform whether PFAS is present within their site, and what management may be required for the contamination identified.

This report has been prepared in conjunction with a Contaminated Site Management Plan[4] (CSMP) and are intended to support resource consent application for the project.

1.2 Purpose and Scope

The purpose of this investigation is to determine whether the site has PFAS contamination in groundwater and soils, whilst also allowing the determination of any human health and environmental risks associated with the works. The findings of this investigation have been used to inform the CSMP.

The scope of this assessment comprised the following:

- Excavation of two boreholes and installation of piezometers to a maximum depth of 6 m below ground level (bgl)
- Collection of a total of six soil samples from various depths in the boreholes.
  - Analysis of selected soil samples for PFAS, heavy metals, benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH).
- Collection of groundwater samples over two monitoring events (i.e. four samples total).
  - Analysis of groundwater samples for PFAS, heavy metals, BTEX, PAH, and TPH.
- Screening of results against relevant assessment criteria.
- Preparation of this report presenting the results of the assessment.

This assessment does not constitute a Detailed Site Investigation under the National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health (NESCS) and is intended as a high-level contamination assessment to assist in informing correct handling and management procedures for earthworks and dewatering.

[3] Preliminary Site Investigation (Contaminated Land) – Allied Asphalt, Aerodrome Road. Beca, 2022.

[4] Contaminated Site Management Plan – Asphalt Plant Upgrades – Aerodrome Road. Beca, 2023.

2 Site Description

The site is located within a property owned by Fulton Hogan Ltd, at 54 Aerodrome Road, Mt Maunganui. **Figure 1** below show the location and extent of the site of this investigation within the wider property.

The site consists of the asphalt plant infrastructure, two large open aggregate storage sheds, site offices, outside aggregate storage areas and several shipping containers used for storage of miscellaneous product or samples from the asphalt making process. A single access point through the front Fulton Hogan yard allows access to the site for all vehicles along the northern boundary. The current asphalt plant is situated in the central to north-eastern quarter of the site. The site is predominantly surfaced with asphalt, with smaller areas of concrete and compacted hardfill.

Refer to the PSI for a full description of the proposed works and environmental setting.

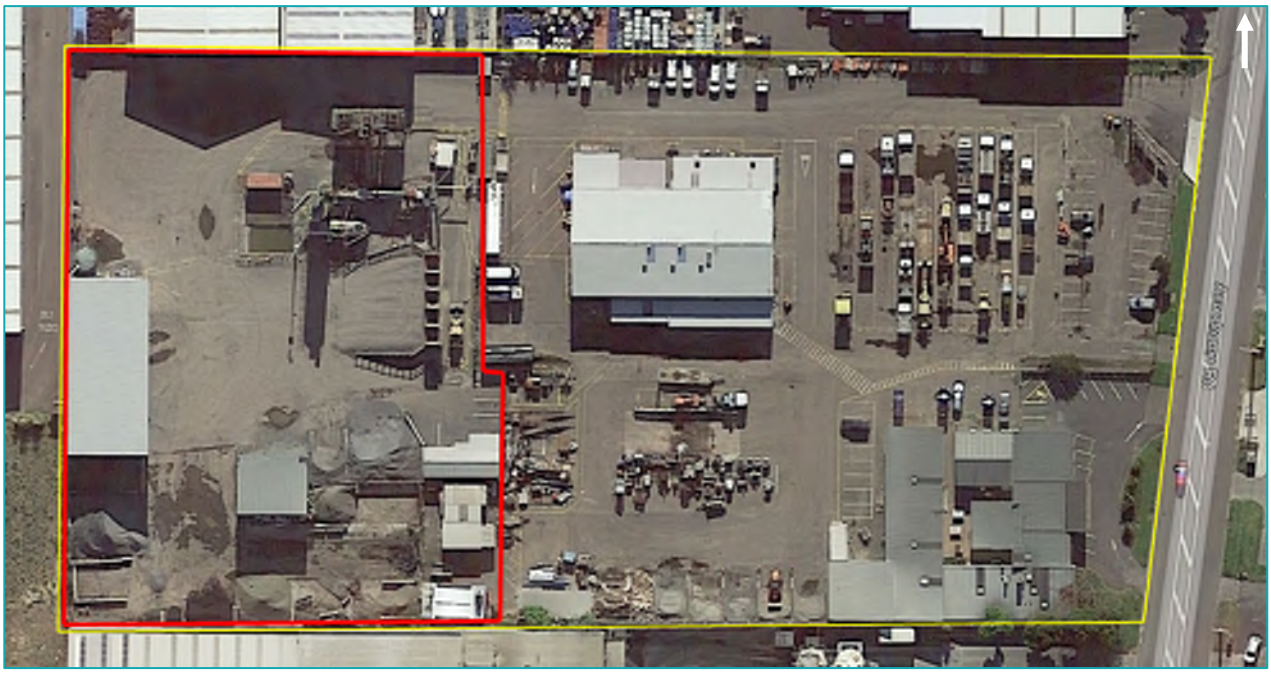


Figure 1. Approximate site extent (outlined red) within Fulton Hogan property (outlined yellow) (Source: Google Earth)

The site is located in the industrial precinct of Mount Maunganui, approximately 1km north of Tauranga harbour (**Figure 2**). The site's stormwater drains to public infrastructure which ultimately discharges to a drain 700m to the west of the site, which runs down the western boundary of Tauranga Airfield and discharges to the harbour. This area of Mount Maunganui is flat and the site sits at approximately 4m asl with neighbouring properties.

Figure 2. Site location (outlined red) and setting (Source: Google Earth)

3 Fieldwork Summary

Soil Sampling

Soil sampling was undertaken on 31 January 2023 by Beca Environmental personnel during the drilling of two boreholes by ProDrill Ltd to a maximum depth of 6m. Drilling was undertaken using an open-barrel rotary machine boring technique. Soil samples were collected at three depths in each borehole (**Table 1**). Soil samples were collected directly from the split at the desired depths, once the core was extracted from the drill barrel.

A borehole location plan is included in **Appendix B.**

Geological logs of the two boreholes are provided as **Appendix C**.

Table 1. Summary of Soil Sampling

Location Reference	Latitude	Longitude	Soil Sample Depths (m bgl)
• **BH01**	• 176.120382°S	• 37.400095°E	• S1: 0.5 • S2: 3.0 • S3: 4.5
• **BH02**	• 176.120305°S	• 37.400372°E	• S1: 0.3 • S2: 1.6 • S3: 3.5

Piezometer Installation and Groundwater Sampling

Piezometers were installed in the two boreholes on 31 January 2023. A Beca Environmental Scientist was present on site while the drilling and installations took place. BH01 was installed to 4.68m bgl and BH02 was installed to 4.8m bgl. Both boreholes were unable to be installed to the targeted depth of 6m due to soft sands collapsing at the base of the borehole, however the obtained piezometer depths were considered appropriate for this shallow groundwater assessment. Screen depths were extended from the base to above the anticipated groundwater table at ~2m bgl. The screened sections were wrapped in filter material and backfilled with clean sand. The top of the piezometer was then completed with a 0.5m bentonite plug and metal lockable toby, flush with ground level.

Two rounds of groundwater sampling were undertaken on 21 February 2023 and 2 March 2023. These events were scheduled near high tide (21 Feb) and low tide (2 March) to assess potential tidal fluctuations in groundwater level. Sampling was undertaken using a peristaltic pump. Each piezometer had 3x the volume of groundwater purged prior to collecting the samples at each event. Field parameters were recorded during sampling with the use of a YSI probe and flow through cell and recorded on field sheets provided as **Appendix D**.

Sampling Methodology

A clean pair of nitrile gloves were worn for each soil and groundwater sample to minimise the potential for cross contamination. Any equipment used was cleaned between each sample with deionised water and Decon90 prior to being rinsed with deionised water again before being re-used. The PFAS sampling procedure involved a ‘clean hands – dirty hands’ approach to minimise the potential for contamination of the samples. Samples were placed in laboratory supplied plastic or glass jars, as appropriate, and chilled prior to dispatch to the nominated IANZ accredited laboratory (R. J. Hill Laboratories Ltd) (Hill Labs) or AsureQuality Ltd for PFAS samples only. All samples submitted to the nominated laboratories were accompanied by Chain of Custody forms which detailed the required handling and testing instructions. These forms are included in **Appendix A**. The following contaminants were selected for analysis based on the findings of the PSI:

- Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc).
- Poly- and Perfluorinated Alkyl Substance (PFAS)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)

A duplicate sample was collected from BH01 during both groundwater sampling events and scheduled for the same analysis as above. This procedure allows for the assessment of fieldwork quality. A trip blank (supplied by the laboratory) was also analysed for PFAS during the groundwater assessment. In addition to these duplicates, quality samples collected during the soil sampling included a rinsate sample and a sample of the driller's water which were both analysed for PFAS only.

4 Screening Criteria

Laboratory results have been screened against adopted assessment criteria identified below.

4.1 Human Health and Environmental Criteria

The adopted screening criteria for the assessment have been selected in general accordance with the hierarchy defined by *Ministry for the Environmental* (MfE) *Contaminated Land Management Guidelines No. 2* (MfE, 2002) and are summarised below. Where relevant, assessment criteria for a commercial/industrial scenario has been adopted based on construction workers involved in the development being most likely exposed to contamination. Criteria adopted for water and soil includes:

Soil:

- *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. Soil Contaminant Standards for a 'Commercial/Industrial' outdoor worker (unpaved) scenario.*
- *Regional Screening Levels, US Environmental Protection Agency (USEPA, 2015). Values applicable to 'Industrial Soil'.*
- *Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (2011).*
- *Heads of EPA Australia and New Zealand PFAS National Environmental Management Plan (NEMP, 2020). Human health investigation levels Industrial/ commercial (HIL D).*

Water:

- *Water Services (Drinking Water Standards for New Zealand) Regulations 2022. Drinking water is not a complete exposure pathway; however, they have been applied as an initial screen for human health purposes.*
- *Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (2011) – Potable use adopted criteria.*

4.2 Environmental

Soil:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018. Toxicant default guideline values for sediment quality – ISQG Low adopted.*
- *Heads of EPA Australia and New Zealand PFAS National Environmental Management Plan (NEMP, 2020). Select scenarios used for each receptor. Ecological guideline values for soil.*

Water:

- *The Australian and New Zealand Guidelines for Fresh & Marine Water Quality (2018) have been selected as the comparison guidelines for groundwater results. Values for 80% and 90% protection selected for comparison. Note that freshwater guidelines were adopted given no fluctuation in groundwater table over tidal events was observed.*
- *Heads of EPA Australia and New Zealand PFAS National Environmental Management Plan (NEMP, 2020). Ecological water quality guideline values.*

4.3 Background Concentrations

Background soil concentrations for the site have been obtained from the Landcare Research portal[5]. Information from this portal pertains to the expected background concentrations for selected heavy metals based on geographic location. For this assessment the 95th percentile background concentrations for the Pakihi Sandstone have been adopted.

[5] https://lris.scinfo.org.nz/layer/470-pbc-predicted-background-soil-concentrations-new-zealand/

5 Results

5.1 Fieldwork Observations

Geological logs outlining soil descriptions observed during drilling are included in **Appendix C**. No visual or olfactory signs of soil contamination were observed in the extracted core at both locations.

Generally, it was observed that hardstand covering the site was underlain by coarse gravel (basecoarse) to ~0.5m. Subsurface material was predominantly sand layers which extended to depth.

During the groundwater sampling exercise no free product was detected with the use of an interface probe. All groundwater samples appeared to be clear and no odours were detected during purging and sampling. Groundwater was encountered at 1.68m bgl in BH01 and 1.9m bgl in BH02 over both events, indicating groundwater is not tidally influenced. Water quality parameters collected in the field with the use of a YSI probe are provided as **Appendix D.**

5.2 Summary of Soil Analytical Results

Laboratory analytical reports are attached in **Appendix E**. A full summary table of results with the applicable human health and environmental criteria is provided in **Appendix F**.

5.2.1 Heavy Metals

A total of four select samples were analysed for heavy metals. In summary:

- Low concentrations of heavy metals were detected in all four samples below background criteria and therefore did not exceed the human health and environmental criteria.

5.2.2 BTEX, PAH, and TPH

Four samples were analysed for BTEX, PAH and TPH. In summary:

- BTEX and PAH concentrations were below laboratory detection limits and therefore did not exceed the adopted human health and environmental criteria.
- Low concentrations of TPH were detected in two samples in the heavy C15-C36 band. These concentrations were below the adopted human health and environmental criteria.

5.2.3 PFAS

Four samples were analysed for a suite of PFAS. In summary:

- PFAS concentrations were below laboratory detection limits and therefore did not exceed the adopted human health and environmental criteria.

5.3 Summary of Groundwater Analytical Results

Laboratory analytical reports are attached in **Appendix E**. A full summary table of results with the applicable human health and environmental criteria is provided in **Appendix F**.

5.3.1 Total Heavy Metals

Four samples were analysed for total heavy metals. In summary:

- Heavy metals were detected in low concentrations in all four samples analysed and were generally consistent between sampling events. Heavy metals concentrations were below the adopted human health and environmental criteria.

5.3.2 BTEX, PAH and TPH

Four samples were analysed for BTEX, PAH and TPH. In summary:

- All results were below laboratory detection limits and therefore did not exceed the adopted human health and environmental criteria.

5.3.3 PFAS

Four samples were analysed for suite of PFAS. In summary:

- Three samples were below laboratory detection limits and therefore did not exceed the adopted human health and environmental criteria.
- One low detection of PFOA (0.04µg/L) was recorded in BH02 during one sampling event, however did not exceed the adopted human health (0.56µg/L, drinking water guideline) or environmental criteria (220µg/L).

5.4 Quality Assurance / Quality Control

Soil:

Quality samples collected during the soil sampling included a rinsate sample (of deionised water rinsed over drilling equipment) and a water sample collected from ProDrill's water supply used in the drilling process. Both samples were analysed for the PFAS suite and PFAS was not detected above the laboratory detection limit.

Groundwater:

Quality samples collected during the groundwater sampling included a duplicate sample collected from BH01 during each sampling event. Additionally, the laboratory provided a trip blank (laboratory supplied water) and undertook a laboratory duplicate of a quality sample. All samples were analysed for the PFAS suite, with PFAS not being detected above the laboratory detection limit in any sample. The trip blank was analysed from the sample event where PFOA was detected in groundwater from BH02. This demonstrates the sample with PFOA was not exposed to potential contamination during handling and transport.

The field duplicate samples were additionally analysed for the full suite of heavy metals, BTEX, PAH, and TPH. The relative percentage difference (RPD) between the primary and duplicate samples has been calculated. The RPD ranged predominantly from 0 to 13% between the samples where analyte concentrations were above laboratory detection limits. These results indicate the analytical results are appropriate and suitable for the purpose of this investigation.

Quality assurance result assessment tables can be found in **Appendix F.**

6 Discussion and Conclusions

Soil and groundwater samples collected from two boreholes were analysed for PFAS, heavy metals, BTEX, PAH and TPH.

Soil analysis identified low concentrations of heavy metals below regional background concentrations and low concentrations of TPH C15 - C36 in two samples below the adopted human health and environmental criteria. PFAS, BTEX, or PAH were not detected in the soil samples analysed. Based on these results, the analysed soils are not considered to present a risk to human health or the environment during project works.

Groundwater analysis detected low concentrations of heavy metals below the adopted guidelines. One detection of PFOA was measured in BH02 however was below the adopted human health and environmental assessment criteria and was not detected during the second monitoring event. All other analytes were below laboratory detection levels. Groundwater assessed in these locations is considered to present a low risk to human health and environment during project works.

Whilst contaminant concentrations present a low risk in both soil and groundwater, a CSMP has been prepared on a precautionary basis given the limited extent of this investigation and inability to fully characterise the site's contamination status. Soil and groundwater management is outlined in the project's CSMP which includes handling procedures, PPE requirements, dewatering protocol, sampling requirements for offsite disposal and accidental discovery protocol that will adequately manage any potential risks posed by contaminants within this site.

7 Limitations

This report has been prepared by Beca Ltd (Beca) solely for the client: Allied Asphalt Limited. Beca has been requested by the Client to provide a contaminated land assessment for the proposed construction of a new asphalt plant within their existing asphalt plant yard located on Aerodrome Road, Mt Maunganui. This report is prepared solely for the purpose of the assessment of potentially contaminated land and groundwater within the proposed works area (Scope). The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope. This report does not constitute a Detailed Site Investigation under the NESCS.

This report is confidential and is prepared solely for the Client. Beca accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

This report contains information obtained by inspection, sampling, testing or other means of investigation. Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, including the information listed above, and has not independently verified the information provided. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided. Publicly available records are frequently inaccurate or incomplete.

The contents of this report are based upon our understanding and interpretation of current legislation and guidelines (“Standards”) as consulting professionals and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

This report should be read in full, having regard to all stated assumptions, limitations and disclaimers.

A

Appendix A – Chain of Custody Forms

Hill Laboratories
TRIED, TESTED AND TRUSTED

ANALYSIS REQUEST

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

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

Job No: **316 5189**
Date Recv: 02-Feb-23 07:27
Received by: David Manson

Quote No		**Lab Order No**
Primary Contact	Lucas Everitt	256240
Submitted By	Lucas Everitt	256240
Client Name	Beca Limited	76225
Address	PO Box 6345 Auckland 1141, New Zealand	
Phone	09 300 9000 *Mobile*	
Email	enviroLab@beca.com	
Charge To	Beca Limited	76225
Client Reference	3936244/301/OA	
Additional Client Ref		
Order No		

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

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

☐ *Email Other* _____

☐ *Other* _____

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories
Date & Time: 1/2/23
Name: Lucas E
☐ *Tick if you require COC to be emailed back*
Signature:

Received at Hill Laboratories
Date & Time:
Name:
Signature:

Condition ☐ *Room Temp* ☐ *Chilled* ☐ *Frozen* *Temp:* 21.5

☐ Sample & Analysis details checked
Signature:

ADDITIONAL INFORMATION / KNOWN HAZARDS

Priority ☐ Low ☑ Normal ☐ High

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

Requested Reporting Date: _____

Quoted Sample Types

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1	BH01 S1 0.5	31/1/23	ES	Hold Cold
2	BH01 S2 3.0			
3	BH01 S3 4.5			
4	BH02 S1 0.3			
5	BH02 S2 1.6			
6	BH02 S3 3.5			
7	EQ BLANK (Grinder)	31/1/23	SW	Hold Cold
8	EQ BLANK TROWEL			
9	TRIP BLANK 01			
10	WATER BLANK 01			

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Job Information Summary

Client:	Beca Limited	**Lab No:**	3165189
Contact:	Lucas Everitt	**Date Registered:**	02-Feb-2023 1:48 pm
	C/- Beca Limited	**Priority:**	High
	PO Box 6345	**Quote No:**	96766
	Wellesley Street	**Order No:**	
	Auckland 1141	**Client Reference:**	3936244/301/DA
		Add. Client Ref:	
		Submitted By:	Lucas Everitt
		Charge To:	Beca Limited
		Target Date:	07-Feb-2023 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH1 S1 0.5m 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
2	BH01 S2 3m 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
3	BH01 S3 4.5m 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
4	BH02 S1 0.3 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
5	BH02 S2 1.6 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
6	BH02 S3 3.5 31-Jan-2023	Soil	GSoil300, SubAsQualPFAS_SoilLH, SubAsQualPFAS_SoilLH	Hold Cold
7	EQ BLANK (DRILLERS) 31-Jan-2023	Blank	SubAsQualTrizP250	Hold Cold
8	EQ BLANK TROWEL 31-Jan-2023	Blank	SubAsQualTrizP250	Hold Cold
9	TRIP BLANK 01 31-Jan-2023	Blank	SubAsQualTrizP250	Hold Cold
10	WATER BLANK 01 31-Jan-2023	Field Blank	SubAsQualTrizP250	Hold Cold

Hill Laboratories
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ANALYSIS REQUEST

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

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

Job No: **317 9333**

Date Recv: 21-Feb-23 15:25

Received by: Ben Kingston

3193793333

Quote No

Primary Contact Curtis Blyth.

Submitted By

Client Name Beca Ltd.

Address

Postcode

Phone Mobile 0273094526

Email Curtis.blyth@beca.com.

Charge To Beca Ltd.

Client Reference

Order No 3936244 -

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

☑ Email Primary Contact ☐ Email Submitter ☐ Email Client

☐ Email Other Curtis.blyth@beca.com

☐ Other

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 21.2.23

Name: Curtis B

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

Signature: (B)

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

Date & Time:

Name:

Signature:

Condition ☐ Room Temp ☐ Chilled ☐ Frozen

Temp: 16.4

ADDITIONAL INFORMATION / KNOWN HAZARDS

Beca - Hills Standard T&C's

Priority ☐ Low ☑ Normal ☐ High

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

Requested Reporting Date:

No.	Sample Name	Sample Date	Sample Time	Sample Type	Tests Required (if not as per Quote)
1	BH101	21.2.23	1015	GW	Sc HMs, TPH/BTEX/PAH, PFAS/PFOA
2	BH102	↓	1130	GW	" " "
3	QC1	↓	-	GW	" " "
4	(+ PFAS TRIP BLANK)	-	-	-	PFAS/PFOA.
5					
6					
7					
8					
9					
10					
11					
12					

Continued on next page

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

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

Job Information Summary

Client:	Beca Limited	**Lab No:**	3179333
Contact:	Curtis Blyth	**Date Registered:**	22-Feb-2023 11:02 am
	C/- Beca Limited	**Priority:**	High
	PO Box 448	**Quote No:**	96766
	Hamilton 3240	**Order No:**	3936244
		Client Reference:	3936244
		Add. Client Ref:	
		Submitted By:	Curtis Blyth
		Charge To:	Beca Limited
		Target Date:	02-Mar-2023 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH101 21-Feb-2023 10:15 am	Ground Water	TPH250, UPte100, N100, VOC40, VOC40, SubAsQualTrizP250, SubAsQualTrizP250	Perfluoro-n-octanoic acid in water; Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq; TPH + BTEX profile, Water
2	BH102 21-Feb-2023 11:30 am	Ground Water	TPH250, UPte100, N100, VOC40, VOC40, SubAsQualTrizP250, SubAsQualTrizP250	Perfluoro-n-octanoic acid in water; Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq; TPH + BTEX profile, Water
3	Q1 21-Feb-2023	Ground Water	TPH250, UPte100, N100, VOC40, VOC40, SubAsQualTrizP250, SubAsQualTrizP250	Perfluoro-n-octanoic acid in water; Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq; TPH + BTEX profile, Water
4	PFAS Trip Blank	Ground Water	SubAsQualTrizP250	Perfluoro-n-octanoic acid in water; Poly- and Perfluorinated Alkyl Substances in Water

Summary of Methods

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

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Perfluoro-n-octanoic acid in water	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	0.0010 µg/L	1-4
Poly- and Perfluorinated Alkyl Substances in Water	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	1-4
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-3
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m^3	1-3
BTEX in Water by Headspace GC-MS	Headspace GC-MS analysis. In-house based on US EPA 8260 and 5021.	0.0010 - 0.002 g/m^3	1-3
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.000005 g/m^3	1-3
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	1-3
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	1-3

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	1-3
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	1-3

Hill Laboratories
A WORLD LEADER IN ANALYTICAL SERVICES

ANAL

Job No: 318 8433
Date Recv: 02-Mar-23 16:03
Received by: Isaac Broadbent

R J Hill Laboratories Lim
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zea

Client

Name: Beca Infrastructure 76225
Address: PO Box 6345, AUCKLAND

Phone: 09 300 9000 Fax: 09 300 9300
Client Reference: AA Groundwater
Quote No: — Order Number: 393244-301

Primary Contact: Curtis Blyth
Submitted By: Anna Kostiuk-Warren
Charge To: Beca Infrastructure 76225

Results To ☐ Mail Client ☐ Mail Submitter
☐ Fax Results Curtis.blyth@beca.com
☑ Email Results envirolab@beca.com

Office use only Job No:

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories Date & Time: Name: Signature:
☑ Please tick if you require COC to be faxed back

Received at Hill Laboratories Date & Time: Name: Signature:

Condition ☐ Room Temp ☐ Chilled ☐ Frozen Temp: 2.6
☐ Sample Analysis details checked Signature:

ADDITIONAL INFORMATION

Please carry out work in accordance with our standard conditions of engagement, as described in letter dated 24-04-13

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

Requested Reporting Date:

Sample Types

Waters	E Effluent	G Geothermal	Pot1 Potable Water (LAS/EU)		Pot2 Potable Water (NZDWS)
	GW Ground Water	L Leachate	☐ Audit Monitoring		Pot3 Potable Water (other)
	SW Surface Water	S Saline	☐ Check Monitoring		Pool Swimming/Spa Pool
	TW Trade Waste				
Solids	ES Soil	SE Sediment	SL Sludge		PL Plant
Other	O O Oil	M Miscellaneous	FS FS Fish/shellfish/biota		BM BM Biological Material

No.	Sample Name	Sample Date & Time	Sample Type	Tests Required
1	BH1	2/3/23 12pm	GW	Heavy metals.
2	BH1	11	1	TPH & PAH
3	BH1	1	11	BTEX & VOC
4	BH1	11	11	PFAS.
5	Q1	11	11	Heavy metals
6	Q1	11	11	TPH & PAH
7	Q1	11	11	BTEX & VOC
8	Q1	11	11	PFAS / PFOA
9	FB - HOLD COLD	11	11	HOLD COLD
10	BH2	2/3/23 1330	11	Heavy metals

Continued on next page

SEE REVERSE

SAMPLE ID	DATE/TIME	TEST	TYPE
BH2	2/3/23 1330	TPH/PAH	GW
BH2	2/3/23 1330	BTEX/VOC	GW
BH2	2/3/23, 1330	PFAS/PFOA	GW

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Job Information Summary

Client:	Beca Limited	**Lab No:**	3188433
Contact:	Curtis Blyth	**Date Registered:**	03-Mar-2023 2:58 pm
	C/- Beca Limited	**Priority:**	High
	PO Box 448	**Quote No:**	96766
	Hamilton 3240	**Order No:**	3936244-301
		Client Reference:	AA Groundwater
		Add. Client Ref:	
		Submitted By:	Curtis Blyth
		Charge To:	Beca Limited
		Target Date:	13-Mar-2023 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH1 02-Mar-2023 12:00 pm	Ground Water	SubAsQualTrizP250, SubAsQualTrizP250, TPH250, N100, UPte100, VOC40, VOC40	Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq; TPH + BTEX profile, Water
2	Q1 02-Mar-2023 12:00 pm	Ground Water	SubAsQualTrizP250, SubAsQualTrizP250, TPH250, N100, UPte100, VOC40, VOC40	Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq; TPH + BTEX profile, Water
3	FB 02-Mar-2023 12:00 pm	Ground Water	SubAsQualTrizP250, SubAsQualTrizP250	Hold Cold
4	BH2 02-Mar-2023 12:00 pm	Ground Water	SubAsQualTrizP250, SubAsQualTrizP250, TPH250, N100, UPte100, VOC40, VOC40	Poly- and Perfluorinated Alkyl Substances in Water; Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn; Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq; TPH + BTEX profile, Water

Summary of Methods

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

Sample Type: Aqueous

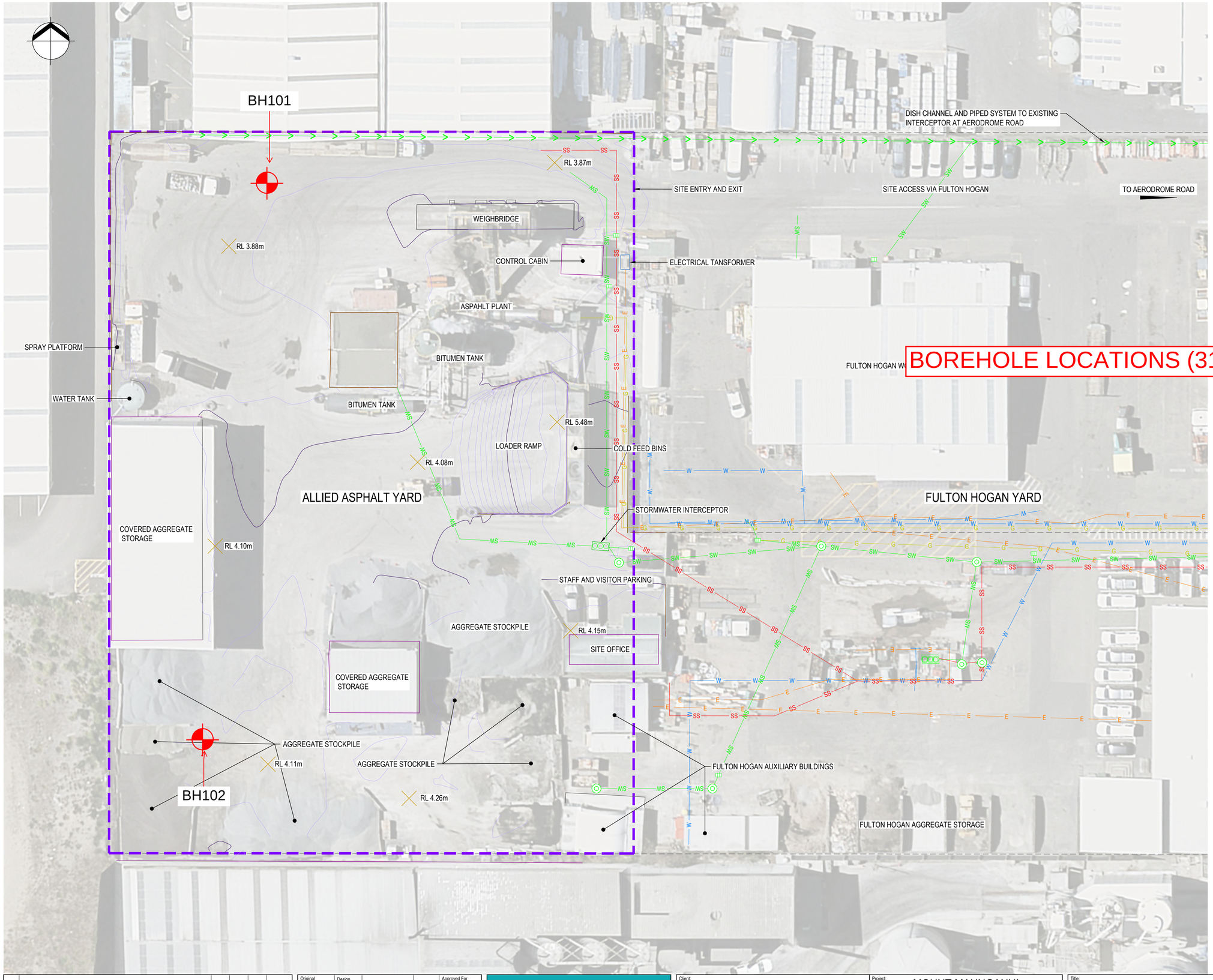
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	1-2, 4
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-2, 4
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-2, 4
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00005 - 0.0010 g/m^3	1-2, 4
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m^3	1-2, 4
BTEX in Water by Headspace GC-MS	Headspace GC-MS analysis. In-house based on US EPA 8260 and 5021.	0.0010 - 0.002 g/m^3	1-2, 4
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m^3	1-2, 4
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m^3	1-2, 4

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m^3	1-2, 4
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m^3	1-2, 4
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m^3	1-2, 4

B

Appendix B – Borehole Location Plan

Drawing Plotted: 23 Nov 2022 11:45 am



LEGEND

- CADASTRAL SITE BOUNDARY
- REDVELOPMENT SITE BOUNDARY
- MAJOR CONTOURS (1m)
- MINOR CONTOURS (100mm)

EXISTING SERVICES

- SS — SEWER LINE
- W — WATER LINE
- G — GAS
- E — POWER
- SW — STORMWATER LINE
- STORMWATER CHANNEL
- STORMWATER MANHOLE
- STORMWATER SUMP

NOTES

1. REFER TO DRAWING 3936244-CA-001 FOR GENERAL NOTES.

BOREHOLE LOCATIONS (31ST JAN)

No.	Revision	By	Chk	Appd	Date
B	FOR RESOURCE CONSENT	JS	JVZ	JVZ	18.11.22
A	DRAFT FOR CLIENT REVIEW	JS	KW	JVZ	07.07.22

Original Scale (A1) 1:250
Reduced Scale (A3) 1:500

Design | Drawn | Dsg Verifier | Drg Check | Approved For Construction* Date

* Refer to Revision 1 for Original Signature

Client: ALLIED ASPHALT

Project: MOUNT MAUNGANUI ASPHALT PLANT CONSENTING

Title: EXISTING SITE PLAN

Discipline: CIVIL

Drawing No.: 3936244-CA-010

Rev.: B

RESOURCE CONSENT
NOT FOR CONSTRUCTION

Document No. 3936244-CA-010.DWG

DO NOT SCALE FOR SET OUT DIMENSIONS

C

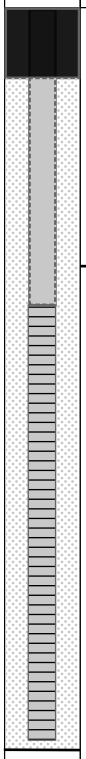
Appendix C – Borehole Logs

Environmental Machine Borehole Log

Borehole ID: BH01

Sheet 1 of 1

Project:	Allied Asphalt Plant	**Project Number:**	3936244/301/DA
Site Location:	Allied Asphalt Plant, Mt Maunganui	**Client:**	Allied Asphalt Limited
Location:	Allied Asphalt Plant, Mt Maunganui	**Coordinate System:**	NZTM2000
		Northing:	176.120382°S
		Easting:	37.400095°E
		Vertical Datum:	NZVD 2016
		Ground Level (mRL):	7.00
		Location Method:	Council GIS Maps



Depth (m)	RL (m)	Samples	Soil/ Rock Description	Geological Unit
0.0	7.0		Asphalt	
0.1	6.9		Fine to coarse GRAVEL with trace fine to coarse sand, black, wet	
0.4	6.6		Fine to coarse SAND, dark greyish brown, moist, firm	
0.5	6.5	ES	Fine to coarse SAND, light greyish brown, moist, firm	
0.8	6.2		Fine to coarse SAND, dark brown, moist, firm	
1.0	6.0			
1.2	5.8		SILT with traces of fine to coarse sand, black, moist, firm	
1.5	5.5		Coarse SAND, yellow, moist, firm	
1.6	5.4		Fine to coarse GRAVEL with traces of silt, dark grey, wet, loose	
1.8	5.2		Fine SAND, dark grey, wet, loose	
2.0	5.0			
2.5	4.5		Medium to coarse SAND, dark brown, firm, moist	
3.0	4.0	ES		
3.5	3.5		Medium to coarse SAND with trace fine gravel, light greyish brown, moist	
4.0	3.0			
4.5	2.5	ES	Fine SAND with fine gravel, light grey, moist, soft	
5.0	2.0			
5.5	1.5			
6.0	1.0			
6.5	0.5			
7.0	0.0			
7.5	-0.5			
8.0	-1.0			
8.5	-1.5			
9.0	-2.0			
9.5	-2.5			

				Comments:
Date Started:	31/01/2023	**Date End:**	31/01/2023	Samples: S1 0.5 - 0.6m, S2 3.00 - 3.10m, S3 4.50 - 4.6m
Logged By:	LE	**Drilled By:**	ProDrill Ltd	Piezometer screen 2m bgl - 4.86m bgl.
Inclination:	NA	**Equipment:**	Machine Bore Drill	
Diameter:	NA	**Method:**	RO	

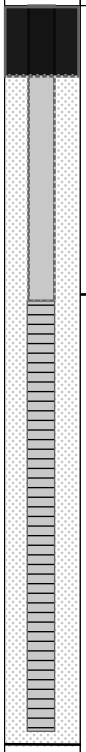
Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.

Environmental Machine Borehole Log

Borehole ID: BH02

Sheet 1 of 1

Project:	Allied Asphalt Plant	**Project Number:**	3936244/301/DA
Site Location:	Allied Asphalt Plant, Mt Maunganui	**Client:**	Allied Asphalt Limited
Location:	Allied Asphalt Plant, Mt Maunganui	**Coordinate System:**	NZTM2000
		Northing:	176.120305°
		Easting:	37.400372°
		Vertical Datum:	NZVD 2016
		Ground Level (mRL):	7.00
		Location Method:	Council GIS Maps



Installations	Drilling: GWL	Drilling: Method	PID	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
				ES	0.5	6.5		Asphalt Coarse GRAVEL with some cobbles, light grey, moist	
								Medium to coarse SAND, orange-brown, dry, loose	
								Fine to coarse GRAVEL, light grey, hard	
					1.0	6.0		Coarse SAND with trace silt, dark brown, moist, soft	
								Coarse SAND, light brown, moist, soft	
				ES	1.5	5.5			
					2.0	5.0			
					2.5	4.5			
					3.0	4.0			
				ES	3.5	3.5		Coarse SAND with some fine to coarse gravel, grey, moist, soft	
					4.0	3.0			
					4.5	2.5			
					5.0	2.0			
					5.5	1.5			
					6.0	1.0			
					6.5	0.5			
					7.0	0.0			
					7.5	-0.5			
					8.0	-1.0			
					8.5	-1.5			
					9.0	-2.0			
					9.5	-2.5			

Date Started:	31/01/2023	**Date End:**	31/01/2023	Comments:
Logged By:	LE	**Drilled By:**	ProDrill Ltd	Samples: S1 0.3 - 0.4m, S2 1.60 - 1.70m, S3 3.50 - 3.60m
Inclination:	NA	**Equipment:**	Machine Bore Drill	Piezometer screen 2m bgl - 4.86m bgl.
Diameter:	NA	**Method:**	RO	

Note: These logs are for environmental purposes only and may not comply with NZGS geotechnical logging guidelines.

D

Appendix D – Field Water Quality Results

GROUNDWATER SAMPLING INFORMATION SHEET

WELL ID	Borehole 101 + QA

PROJECT INFORMATION

Job Number:		Date:	21/02/23
Site Location:	Allied Asphalt Tauranga	Sampled by:	Curtis
Client:		Sampling method:	peristeltic
Total Depth of Product:	—	Initial/Final Depth to Water:	1.68 m bgl / 1.7 m bgl
Weather Conditions:	fine, some cloud		

WELL INFORMATION

Pipe Diameter	50mm
Depth of Well	4.86 m bgl
Well Height	—
Northing	
Easting	

GROUNDWATER MONITORING RECORD

TIME	VOLUME PURGED (L)	FLOW RATE (L/min)	°C	DO%	DO mg/L	SPC -us/cm	C -us	pH	pH mV	ORP mV	OBSERVATIONS
10:19am	17.6 L	—	20.2	0.3	0.03	362.2	328.8	6.42	26.7	—	
10:25am	20.		20.4	0.8	0.07	356.0	325.2	6.4	29.1	—	

OTHER INFORMATION

NOTES (Colour, Odour, Turbidity etc.)

water table 1.68m.
no free product*
Bottom of well 4.68

Pipe diameter × π
19.6H × 300 cm = 5890 cm³
5.89L × 3 = 17.6 L to purge.

Purge start 9:45am

tides = high tide @ 9:49am low @ 2:54pm

CONTAINERS FILLED

- ☐ 1L Unpreserved (Water for Analysis)
- ☑ 100mL Unpreserved (Dissolved Metals)
- ☑ 100mL Nitric Acid Preserve (Total Metals)
- ☐ 500mL Amber Glass Unpreserved (Water for Organics)
- ☑ 250mL Amber Glass Sulphuric Acid Preserve (Water for TPH)
- ☑ 2 x 40mL Amber Glass Absorbic Acid Preserve (Water for VOC/BTEX)
- ☑ Other ~~Heavy metals~~ PFAS

SAMPLE DETAILS

Primary Sample	
Duplicate	
Trip Blank	
Field Blank	

GROUNDWATER SAMPLING INFORMATION SHEET

WELL ID	Borehole 102 + BH2.

PROJECT INFORMATION

Job Number: _____ Date: 21/12/23

Site Location: _____ Sampled by: Curtis & Emily

Client: Allied Asphalt Sampling method: Peristeltic/ pump.

Total Depth of Product: _____ Initial/Final Depth to Water: 1.9m bgl /

Weather Conditions: Sunny, some Cloud

WELL INFORMATION

Pipe Diameter	50mm
Depth of Well	4.8m bgl
Well Height	—
Northing	—
Easting	—

GROUNDWATER MONITORING RECORD

TIME	VOLUME PURGED (L)	FLOW RATE (L/min)	°C	DO%	DO mg/L	SPC -us/cm	C -us	pH	pH mV	ORP mV	OBSERVATIONS
11:27am	17.6		20.4	1.7	0.15	497.6	454.0	6.36	30.4	—	
11:33am			20.4	0.5	0.04	499.2	455.3	6.36	30.4	—	

OTHER INFORMATION

NOTES (Colour, Odour, Turbidity etc.)

Start purge @ 10:57am

Water table = 1.9m bgl

No free product

Bottom of well = 4.8m bgl.

CONTAINERS FILLED

- ☐ 1L Unpreserved (Water for Analysis)
- ☑ 100mL Unpreserved (Dissolved Metals)
- ☑ 100mL Nitric Acid Preserve (Total Metals)
- ☐ 500mL Amber Glass Unpreserved (Water for Organics)
- ☑ 250mL Amber Glass Sulphuric Acid Preserve (Water for TPH)
- ☑ 2 x 40mL Amber Glass Absorbic Acid Preserve (Water for VOC/BTEX)
- ☑ Other PFAS

SAMPLE DETAILS

Primary Sample	
Duplicate	
Trip Blank	
Field Blank	

GROUNDWATER SAMPLING INFORMATION SHEET

WELL ID	BH01

PROJECT INFORMATION

Job Number:

Date: 2/03/2023

Site Location: 56 Aerodrome Rd, Mt Maunganui

Sampled by: Anna KW & Hayley S

Client: Allied Asphalt

Sampling method: Peristaltic

Total Depth of Product: —

Initial/Final Depth to Water: 1.68m bgl

Weather Conditions: fine

Same after

WELL INFORMATION

Pipe Diameter	50mm
Depth of Well	4.86m bgl
Well Height	
Northing	
Easting	

GROUNDWATER MONITORING RECORD

TIME	VOLUME PURGED (L)	FLOW RATE (L/min)	°C	DO%	DO mg/L	SPC -us/cm	C -us	pH	pH mV	ORP mV	OBSERVATIONS
11:49 ~~1.5ml~~	17L	—	20.6	91%	0.33	339.0	311.0	6.19	52.0		
			20.6	0.9	0.08	336.4	308.6	6.17	53.2		

OTHER INFORMATION

NOTES (Colour, Odour, Turbidity etc.)

CONTAINERS FILLED

- ☐ 1L Unpreserved (Water for Analysis)
- ☐ 100mL Unpreserved (Dissolved Metals)
- ☐ 100mL Nitric Acid Preserve (Total Metals)
- ☐ 500mL Amber Glass Unpreserved (Water for Organics)
- ☐ 250mL Amber Glass Sulphuric Acid Preserve (Water for TPH)
- ☐ 2 x 40mL Amber Glass Absorbic Acid Preserve (Water for VOC/BTEX)
- ☐ Other

SAMPLE DETAILS

Primary Sample	BH1
Duplicate	Q1
Trip Blank	
Field Blank	FB

↳ deionised water

GROUNDWATER SAMPLING INFORMATION SHEET

WELL ID	BH02

PROJECT INFORMATION

Job Number:

Site Location: Allied Asphalt

Client:

Total Depth of Product:

Weather Conditions: Fine

Date: 2.3.23

Sampled by: Holly + Anna

Sampling method:

Initial/Final Depth to Water: 1.9

WELL INFORMATION

Pipe Diameter	50
Depth of Well	4.8
Well Height	
Northing	
Easting	

GROUNDWATER MONITORING RECORD

TIME	VOLUME PURGED (L)	FLOW RATE (L/min)	°C	DO%	DO mg/L	SPC -us/cm	C -us	pH	pH mV	ORP mV	OBSERVATIONS
1317			21	5.4	0.44	474	438.0	6.17	53.4		
1322			21	1.5	0.14	473	435.9	6.16	53.5		

OTHER INFORMATION

NOTES (Colour, Odour, Turbidity etc.)

CONTAINERS FILLED

- ☐ 1L Unpreserved (Water for Analysis)
- ☐ 100mL Unpreserved (Dissolved Metals)
- ☐ 100mL Nitric Acid Preserve (Total Metals)
- ☐ 500mL Amber Glass Unpreserved (Water for Organics)
- ☐ 250mL Amber Glass Sulphuric Acid Preserve (Water for TPH)
- ☐ 2 x 40mL Amber Glass Absorbic Acid Preserve (Water for VOC/BTEX)
- ☐ Other

SAMPLE DETAILS

Primary Sample	BH2
Duplicate	None
Trip Blank	
Field Blank	

E

Appendix E – Laboratory Reports

Hill Laboratories
TRIED, TESTED AND TRUSTED

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

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

Certificate of Analysis

Client:	Beca Limited	**Lab No:**	3165189	SPv1
Contact:	Curtis Blyth C/- Beca Limited PO Box 448 Hamilton 3240	**Date Received:** **Date Reported:** **Quote No:** **Order No:** **Client Reference:** **Submitted By:**	02-Feb-2023 24-Feb-2023 96766 3936244/301/DA Curtis Blyth	

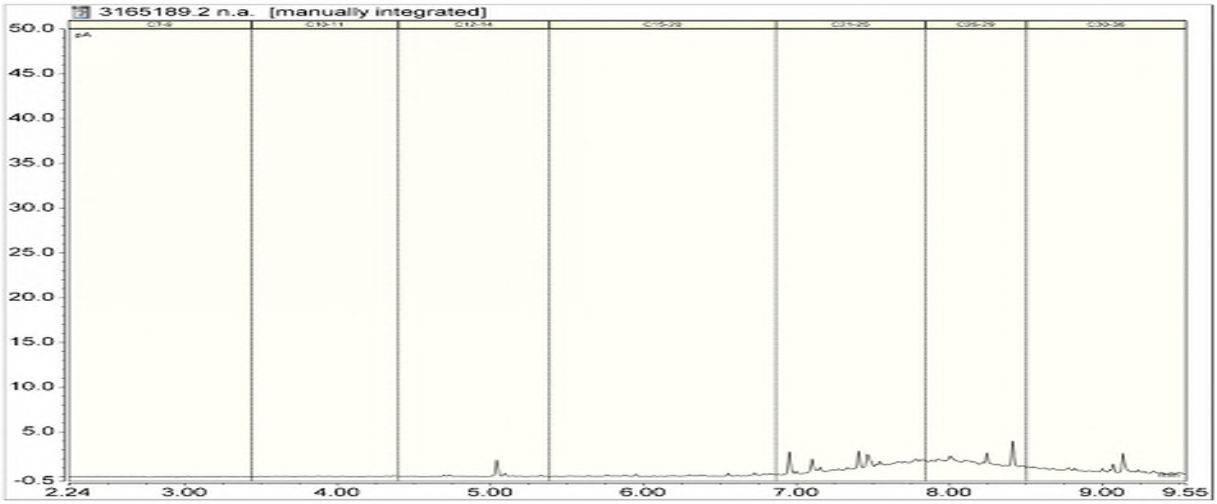
Sample Type: Soil

Sample Name:	BH1 S1 0.5m 31-Jan-2023	BH01 S2 3m 31-Jan-2023	BH02 S1 0.3 31-Jan-2023	BH02 S2 1.6 31-Jan-2023
Lab Number:	3165189.1	3165189.2	3165189.4	3165189.5
Individual Tests				
Poly- and Perfluorinated Alkyl Substances in Soil*‡	See attached report	See attached report	See attached report	See attached report
Dry Matter g/100g as rcvd	91	84	89	80
Heavy Metals with Mercury, Screen Level				
Total Recoverable Arsenic mg/kg dry wt	9	< 2	< 2	5
Total Recoverable Cadmium mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium mg/kg dry wt	4	3	5	4
Total Recoverable Copper mg/kg dry wt	< 2	< 2	6	< 2
Total Recoverable Lead mg/kg dry wt	3.2	2.7	3.6	2.6
Total Recoverable Mercury mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Nickel mg/kg dry wt	< 2	< 2	2	< 2
Total Recoverable Zinc mg/kg dry wt	16	5	24	14
BTEX in Soil by Headspace GC-MS				
Benzene mg/kg dry wt	< 0.05	< 0.05	< 0.05	< 0.05
Toluene mg/kg dry wt	< 0.05	< 0.05	< 0.05	< 0.05
Ethylbenzene mg/kg dry wt	< 0.05	< 0.05	< 0.05	< 0.05
m&p-Xylene mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
o-Xylene mg/kg dry wt	< 0.05	< 0.05	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil mg/kg dry wt	< 0.3	< 0.3	< 0.3	< 0.3
1-Methylnaphthalene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
2-Methylnaphthalene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Acenaphthylene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Acenaphthene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Anthracene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[a]anthracene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[a]pyrene (BAP) mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES* mg/kg dry wt	< 0.026	< 0.029	< 0.027	< 0.030
Benzo[a]pyrene Toxic Equivalence (TEF)* mg/kg dry wt	< 0.026	< 0.029	< 0.027	< 0.030
Benzo[b]fluoranthene + Benzo[j]fluoranthene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[e]pyrene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[g,h,i]perylene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Benzo[k]fluoranthene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Chrysene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Dibenzo[a,h]anthracene mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013

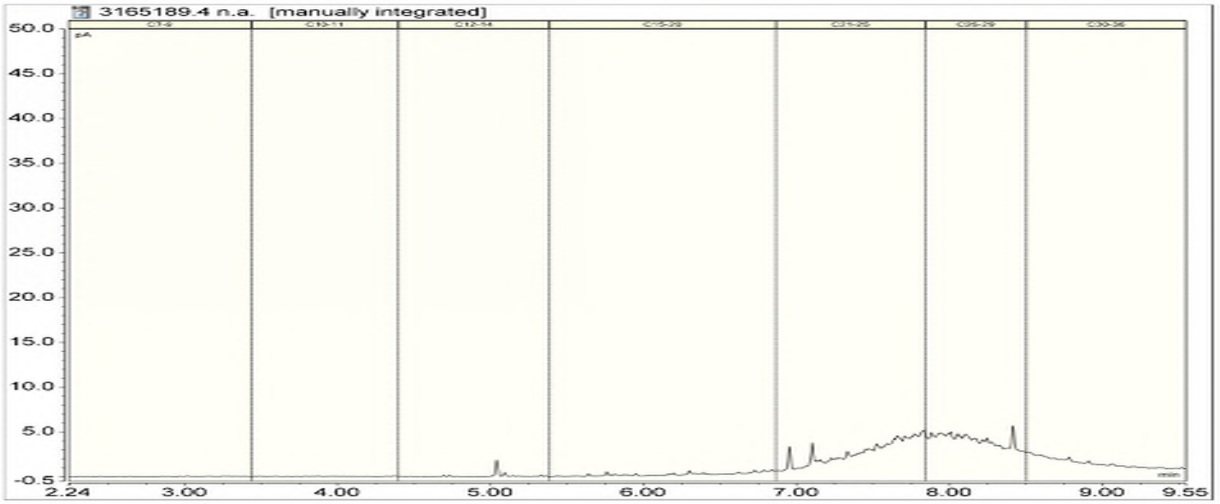
Sample Type: Soil					
Sample Name:		BH1 S1 0.5m 31-Jan-2023	BH01 S2 3m 31-Jan-2023	BH02 S1 0.3 31-Jan-2023	BH02 S2 1.6 31-Jan-2023
Lab Number:		3165189.1	3165189.2	3165189.4	3165189.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Fluoranthene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Fluorene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Naphthalene	mg/kg dry wt	< 0.06	< 0.06	< 0.06	< 0.07
Perylene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Phenanthrene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Pyrene	mg/kg dry wt	< 0.011	< 0.012	< 0.011	< 0.013
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	< 20	< 20	< 20	< 20
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	157	360	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	159	360	< 80

Sample Type: Aqueous			
Sample Name:		EQ BLANK (DRILLERS) 31-Jan-2023	WATER BLANK 01 31-Jan-2023
Lab Number:		3165189.7	3165189.10
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water*‡		See attached report	See attached report

3165189.2
BH01 S2 3m 31-Jan-2023
Client Chromatogram for TPH by FID



3165189.4
BH02 S1 0.3 31-Jan-2023
Client Chromatogram for TPH by FID



Analyst's Comments

‡ Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

Appendix No.1 - AsureQuality Report

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-2, 4-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-2, 4-5
Poly- and Perfluorinated Alkyl Substances in Soil*	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	1-2, 4-5
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-2, 4-5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	1-2, 4-5
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b) fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	1-2, 4-5
Heavy Metals with Mercury, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2, 4-5
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis. Tested on as received sample. In-house based on US EPA 8260 and 5021.	0.05 - 0.10 mg/kg dry wt	1-2, 4-5
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1-2, 4-5
Total Petroleum Hydrocarbons in Soil			

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	2, 4
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2, 4-5
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2, 4-5
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-2, 4-5
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	70 mg/kg dry wt	1-2, 4-5

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water*	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	7, 10

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

Testing was completed between 16-Feb-2023 and 24-Feb-2023. For completion dates of individual analyses please contact the laboratory.

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

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

Ara Heron BSc (Tech)
Client Services Manager - Environmental

AsureQuality Limited | 1C Quadrant Drive | Waiwhetu | Lower Hutt 5010 | Wellington | New Zealand
PO Box 31242 | Lower Hutt 5040 | Wellington | New Zealand
t. +64 4 570 8800 | e. cswellington@asurequality.com | w. www.asurequality.com

Certificate of Analysis

Submission Reference: EnvSubAQ_LH 708
Final Report

Environment Client Service Managers
Hill Laboratories - Hamilton
Private Bag 3205
Hamilton 3240
New Zealand

PO Number: 159079

Report Issued: 24-Feb-2023 **AsureQuality Reference: 23-46936** **Sample(s) Received:** 16-Feb-2023 08:15

Testing Period: 16-Feb-2023 to 23-Feb-2023
Date of analysis is available on request.

Results

The tests were performed on the samples as received.

Customer Sample Name: BH1 S1 0.5m **Lab ID:** 23-46936-1

Sample Description: 3165189.1

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	89	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	86	%	AsureQuality Method (LC-MS/MS)
M8PFOS	100	%	AsureQuality Method (LC-MS/MS)
M4PFBA	91	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	93	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	94	%	AsureQuality Method (LC-MS/MS)
MPFHpA	91	%	AsureQuality Method (LC-MS/MS)
M8PFOA	79	%	AsureQuality Method (LC-MS/MS)
M9PFNA	101	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	107	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	118	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	148	%	AsureQuality Method (LC-MS/MS)
MPFOSA	112	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	134	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	139	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	122	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	121	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	131	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	122	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	90	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	88	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	100	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: BH01 S2 3m **Lab ID:** 23-46936-2

Sample Description: 3165189.2

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids

Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	96	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	96	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
M8PFOS	99	%	AsureQuality Method (LC-MS/MS)
M4PFBA	92	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	93	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	96	%	AsureQuality Method (LC-MS/MS)
M8PFOA	93	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	98	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	100	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	138	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	254 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	106	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	137	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	142	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	130	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	126	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	127	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	118	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	99	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	109	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	91	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: BH02 S1 0.3 **Lab ID:** 23-46936-3

Sample Description: 3165189.4

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	85	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	86	%	AsureQuality Method (LC-MS/MS)
M8PFOS	99	%	AsureQuality Method (LC-MS/MS)
M4PFBA	88	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	88	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	90	%	AsureQuality Method (LC-MS/MS)
MPFHpA	87	%	AsureQuality Method (LC-MS/MS)
M8PFOA	82	%	AsureQuality Method (LC-MS/MS)
M9PFNA	97	%	AsureQuality Method (LC-MS/MS)
M6PFDA	109	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	103	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	139	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	203 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	112	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	151 (R)	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	143	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	130	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	117	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	135	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	122	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	86	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	83	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	106	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
M3HFPO-DA	90	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Customer Sample Name: BH02 S2 1.6 **Lab ID:** 23-46936-4

Sample Description: 3165189.5

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	94	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	90	%	AsureQuality Method (LC-MS/MS)
M8PFOS	97	%	AsureQuality Method (LC-MS/MS)
M4PFBA	95	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	89	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	93	%	AsureQuality Method (LC-MS/MS)
MPFHpA	91	%	AsureQuality Method (LC-MS/MS)
M8PFOA	82	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	102	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	101	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	106	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	89	%	AsureQuality Method (LC-MS/MS)
MPFOSA	112	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	128	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	133	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	113	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	114	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	128	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	122	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	90	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	89	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	99	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: EQ BLANK (DRILLERS) **Lab ID:** 23-46936-5

Sample Description: 3165189.7

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	NR	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	107	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	106	%	AsureQuality Method (LC-MS/MS)
M8PFOS	113	%	AsureQuality Method (LC-MS/MS)
M4PFBA	101	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	102	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	106	%	AsureQuality Method (LC-MS/MS)
MPFHpA	109	%	AsureQuality Method (LC-MS/MS)
M8PFOA	113	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	115	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	106	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
MPFDoDA	115	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	33	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	99	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	93	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	105	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	108	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	85	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	103	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	143	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	100	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: WATER BLANK 01 **Lab ID:** 23-46936-6

Sample Description: 3165189.10

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	NR	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	110	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	110	%	AsureQuality Method (LC-MS/MS)
M8PFOS	121	%	AsureQuality Method (LC-MS/MS)
M4PFBA	92	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	103	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)
MPFHpA	105	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	106	%	AsureQuality Method (LC-MS/MS)
M6PFDA	102	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	85	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	75	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	65	%	AsureQuality Method (LC-MS/MS)
MPFOSA	74	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	37	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	41	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	77	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	91	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	43	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	53	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	113	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	143	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	94	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	108	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Customer Sample Name: Duplicate of 23-46936-6A **Lab ID:** 23-46936-7

Sample Description: 21250578_duplicate

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	NR	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	100	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	93	%	AsureQuality Method (LC-MS/MS)
M8PFOS	98	%	AsureQuality Method (LC-MS/MS)
M4PFBA	90	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	98	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	93	%	AsureQuality Method (LC-MS/MS)
MPFHpA	96	%	AsureQuality Method (LC-MS/MS)
M8PFOA	99	%	AsureQuality Method (LC-MS/MS)
M9PFNA	89	%	AsureQuality Method (LC-MS/MS)
M6PFDA	98	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	78	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	79	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	53	%	AsureQuality Method (LC-MS/MS)
MPFOSA	85	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	54	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	67	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	76	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	86	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	65	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	66	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	137	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	76	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	94	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Dupl.of 23-46936-4A **Lab ID:** 23-46936-8

Sample Description: 21250576_Duplicate

Sample Condition: Acceptable **Sampled Date**: 02-Feb-2023

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	96	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	100	%	AsureQuality Method (LC-MS/MS)
M8PFOS	108	%	AsureQuality Method (LC-MS/MS)
M4PFBA	97	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	91	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	99	%	AsureQuality Method (LC-MS/MS)
MPFHpA	92	%	AsureQuality Method (LC-MS/MS)
M8PFOA	92	%	AsureQuality Method (LC-MS/MS)
M9PFNA	100	%	AsureQuality Method (LC-MS/MS)
M6PFDA	109	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	95	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	112	%	AsureQuality Method (LC-MS/MS)

Test	Result	Unit	Method Reference
MPFTeDA	111	%	AsureQuality Method (LC-MS/MS)
MPFOSA	119	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	137	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	142	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	125	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	125	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	137	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	134	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	113	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	108	%	AsureQuality Method (LC-MS/MS)

QC Results

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Relates to sample(s) 23-46936-1, 23-46936-2, 23-46936-3, 23-46936-4, 23-46936-8

Test	Result	Unit	Method Reference
Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
PFTeDA	NR	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
P37DMOA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	mg/kg (dry weight)	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	82	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	78	%	AsureQuality Method (LC-MS/MS)
M8PFOS	88	%	AsureQuality Method (LC-MS/MS)
M4PFBA	87	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	84	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	86	%	AsureQuality Method (LC-MS/MS)
MPFHpA	81	%	AsureQuality Method (LC-MS/MS)
M8PFOA	75	%	AsureQuality Method (LC-MS/MS)
M9PFNA	87	%	AsureQuality Method (LC-MS/MS)
M6PFDA	93	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	85	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	101	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	95	%	AsureQuality Method (LC-MS/MS)
MPFOSA	101	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	110	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	120	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	112	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	110	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	106	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Test	Result	Unit	Method Reference
M4:2FTS	81	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	73	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	84	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	80	%	AsureQuality Method (LC-MS/MS)

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Relates to sample(s) 23-46936-5, 23-46936-6, 23-46936-7

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	NR	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	89	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	66	%	AsureQuality Method (LC-MS/MS)
M8PFOS	52	%	AsureQuality Method (LC-MS/MS)
M4PFBA	97	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	98	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	90	%	AsureQuality Method (LC-MS/MS)
MPFHpA	90	%	AsureQuality Method (LC-MS/MS)
M8PFOA	83	%	AsureQuality Method (LC-MS/MS)
M9PFNA	66	%	AsureQuality Method (LC-MS/MS)
M6PFDA	60	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	37	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	38	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	18 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	74	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	43	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	62	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	47	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	56	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	73	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	78	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	85	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	68	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	86	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

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Analysis Summary

Wellington Laboratory

Analysis	Method	Accreditation	Authorised by
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
DX-PFCS01, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Amelie Sellier

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)
mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)
L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)
Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)
di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)
mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)
L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)
Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)
Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)
Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)
For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.
Reported results are corrected for internal standard recovery

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids			
DX-PFCS02, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Amelie Sellier

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)
mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)
L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)
Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)
di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)
mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)
L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)
Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)
Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)
Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)
For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.
Reported results are corrected for internal standard recovery

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.
NR = Not Reportable

Amelie Sellier
Scientist

Accreditation

Appendix

Analyte LOR Summary

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Listing applies to samples: 23-46936-5, 23-46936-6, 23-46936-7	
Perfluoroalkylsulfonic acids	
PFPrS	0.0010 µg/L
PFBS	0.0010 µg/L
PFPeS	0.0010 µg/L
di-PFHxS (1)	0.0010 µg/L
mono-PFHxS (1)	0.0010 µg/L
L-PFHxS (1)	0.0010 µg/L
Total PFHxS (3)	0.0010 µg/L
PFHpS	0.0010 µg/L
di-PFOS (5)	0.0010 µg/L
mono-PFOS (5)	0.0010 µg/L
L-PFOS (5)	0.0010 µg/L
Total PFOS (7)	0.0010 µg/L
Sum PFHxS+PFOS (1)	0.0010 µg/L
PFNS	0.0010 µg/L
PFDS	NR µg/L
PFECHS	NR µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.0010 µg/L
PFPeA	0.0010 µg/L
PFHxA	0.0010 µg/L
PFHpA	0.0010 µg/L
PFOA	0.0010 µg/L
PFNA	0.0010 µg/L
PFDA	0.0010 µg/L
PFUnDA	0.0010 µg/L
PFDoDA	0.0010 µg/L
PFTrDA	NR µg/L
PFTeDA	0.0010 µg/L
P37DMOA	0.0010 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.0010 µg/L
NEtFOSA-M	0.0010 µg/L
NMeFOSA-M	0.0010 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.0010 µg/L
NMeFOSAA	0.0010 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.0010 µg/L
NMeFOSE-M	0.0010 µg/L
Telomere Sulfonic acids	
4:2 FTS	0.0010 µg/L
6:2 FTS	0.0010 µg/L
8:2 FTS	0.0010 µg/L
10:2 FTS	0.0010 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.0010 µg/L

FPePA (5:3FTA)	0.0010 µg/L
FHpPA (7:3FTA)	0.0010 µg/L
Miscellaneous	
F-53B (major)	0.0010 µg/L
F-53B (minor)	0.0010 µg/L
Sum F-53B	0.0010 µg/L
ADONA	0.0010 µg/L
HFPO-DA (GenX)	0.0010 µg/L

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids - AsureQuality Method (LC-MS/MS)

Analyte	**LOR**
Listing applies to samples: 23-46936-1, 23-46936-2, 23-46936-3, 23-46936-4, 23-46936-8	
Perfluoroalkylsulfonic acids	
PFPrS	0.0010 mg/kg (dry weight)
PFBS	0.0010 mg/kg (dry weight)
PFPeS	0.0010 mg/kg (dry weight)
di-PFHxS (1)	0.0010 mg/kg (dry weight)
mono-PFHxS (1)	0.0010 mg/kg (dry weight)
L-PFHxS (1)	0.0010 mg/kg (dry weight)
Total PFHxS (3)	0.0010 mg/kg (dry weight)
PFHpS	0.0010 mg/kg (dry weight)
di-PFOS (5)	0.0010 mg/kg (dry weight)
mono-PFOS (5)	0.0010 mg/kg (dry weight)
L-PFOS (5)	0.0010 mg/kg (dry weight)
Total PFOS (7)	0.0010 mg/kg (dry weight)
Sum PFHxS+PFOS (1)	0.0010 mg/kg (dry weight)
PFNS	0.0010 mg/kg (dry weight)
PFDS	0.0010 mg/kg (dry weight)
PFECHS	0.0010 mg/kg (dry weight)
Perfluoroalkylcarboxylic acids	
PFBA	0.0010 mg/kg (dry weight)
PFPeA	0.0010 mg/kg (dry weight)
PFHxA	0.0010 mg/kg (dry weight)
PFHpA	0.0010 mg/kg (dry weight)
PFOA	0.0010 mg/kg (dry weight)
PFNA	0.0010 mg/kg (dry weight)
PFDA	0.0010 mg/kg (dry weight)
PFUnDA	0.0010 mg/kg (dry weight)
PFDoDA	0.0010 mg/kg (dry weight)
PFTrDA	0.0010 mg/kg (dry weight)
PFTeDA	NR mg/kg (dry weight)
P37DMOA	0.0010 mg/kg (dry weight)
Perfluorooctanesulfonamides	
PFOSA	0.0010 mg/kg (dry weight)
NEtFOSA-M	0.0010 mg/kg (dry weight)
NMeFOSA-M	0.0010 mg/kg (dry weight)
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.0010 mg/kg (dry weight)
NMeFOSAA	0.0010 mg/kg (dry weight)
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.0010 mg/kg (dry weight)
NMeFOSE-M	0.0010 mg/kg (dry weight)
Telomere Sulfonic acids	

4:2 FTS	0.0010 mg/kg (dry weight)
6:2 FTS	0.0010 mg/kg (dry weight)
8:2 FTS	0.0010 mg/kg (dry weight)
10:2 FTS	0.0010 mg/kg (dry weight)
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.0010 mg/kg (dry weight)
FPePA (5:3FTA)	0.0010 mg/kg (dry weight)
FHpPA (7:3FTA)	0.0010 mg/kg (dry weight)
Miscellaneous	
F-53B (major)	0.0010 mg/kg (dry weight)
F-53B (minor)	0.0010 mg/kg (dry weight)
Sum F-53B	0.0010 mg/kg (dry weight)
ADONA	0.0010 mg/kg (dry weight)
HFPO-DA (GenX)	0.0010 mg/kg (dry weight)

Analyte Definitions

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 23-46936-5, 23-46936-6, 23-46936-7	
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	

Analyte	Full Name
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[-1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

Poly and Perfluorinated Alkyl Substances (PFAS) in Soil, Sediment and Biosolids - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 23-46936-1, 23-46936-2, 23-46936-3, 23-46936-4, 23-46936-8	
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids

Analyte	Full Name
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[-1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid

AsureQuality Reference: 23-46936 **Report Issued:** 24-Feb-2023

Analyte	Full Name
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

LOR = Limit of Reporting LOD = Limit of Detection NR = Not Reportable

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

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

Certificate of Analysis

Client:	Beca Limited	**Lab No:**	3179333	SPv2
Contact:	Curtis Blyth C/- Beca Limited PO Box 448 Hamilton 3240	**Date Received:**	21-Feb-2023	
		Date Reported:	07-Mar-2023	
		Quote No:	96766	
		Order No:	3936244	
		Client Reference:	3936244	
		Submitted By:	Curtis Blyth	

Sample Type: Aqueous

Sample Name:		BH101 21-Feb-2023 10:15 am	BH102 21-Feb-2023 11:30 am	Q1 21-Feb-2023	PFAS Trip Blank
Lab Number:		3179333.1	3179333.2	3179333.3	3179333.4
Individual Tests					
Poly- and Perfluorinated Alkyl Substances in Water‡		See attached report	See attached report	See attached report	See attached report
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn					
Total Arsenic	g/m³	0.0148	0.0024	0.0144	-
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053	-
Total Chromium	g/m³	0.00177	0.00140	0.00178	-
Total Copper	g/m³	0.00061	< 0.00053	0.00067	-
Total Lead	g/m³	0.00016	< 0.00011	0.00016	-
Total Nickel	g/m³	0.00105	0.00078	0.00113	-
Total Zinc	g/m³	0.0026	0.0034	0.0028	-
BTEX in Water by Headspace GC-MS					
Benzene	g/m³	< 0.0010	< 0.0010	< 0.0010	-
Toluene	g/m³	< 0.0010	< 0.0010	< 0.0010	-
Ethylbenzene	g/m³	< 0.0010	< 0.0010	< 0.0010	-
m&p-Xylene	g/m³	< 0.002	< 0.002	< 0.002	-
o-Xylene	g/m³	< 0.0010	< 0.0010	< 0.0010	-
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq					
Acenaphthene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Acenaphthylene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Anthracene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Benzo[a]anthracene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Benzo[a]pyrene (BAP)	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Benzo[g,h,i]perylene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Benzo[k]fluoranthene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Chrysene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Dibenzo[a,h]anthracene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Fluoranthene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Fluorene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Naphthalene	g/m³	< 0.00010	< 0.00010	< 0.00010	-
Phenanthrene	g/m³	< 0.00002	< 0.00002	< 0.00002	-
Pyrene	g/m³	< 0.00002	< 0.00002	< 0.00002	-

Sample Type: Aqueous					
Sample Name:		BH101 21-Feb-2023 10:15 am	BH102 21-Feb-2023 11:30 am	Q1 21-Feb-2023	PFAS Trip Blank
Lab Number:		3179333.1	3179333.2	3179333.3	3179333.4
Total Petroleum Hydrocarbons in Water					
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10	-
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2	-
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4	-
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7	-

Analyst's Comments

‡ Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

Appendix No.1 - AsureQuality Report

Summary of Methods

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

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	4
Poly- and Perfluorinated Alkyl Substances in Water - High Level	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	1-3
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-3
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m³	1-3
BTEX in Water by Headspace GC-MS	Headspace GC-MS analysis. In-house based on US EPA 8260 and 5021.	0.0010 - 0.002 g/m³	1-3
Polycyclic Aromatic Hydrocarbons Trace in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.000005 g/m³	1-3
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m³	1-3
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m³	1-3
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m³	1-3
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m³	1-3

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

Testing was completed between 24-Feb-2023 and 07-Mar-2023. For completion dates of individual analyses please contact the laboratory.

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

Kim Harrison MSc
Client Services Manager - Environmental

AsureQuality Limited | 1C Quadrant Drive | Waiwhetu | Lower Hutt 5010 | Wellington | New Zealand
PO Box 31242 | Lower Hutt 5040 | Wellington | New Zealand
t. +64 4 570 8800 | e. cswellington@asurequality.com | w. www.asurequality.com

Certificate of Analysis

Submission Reference: EnvSubAQ_LH 716
Final Report

Environment Client Service Managers
Hill Laboratories - Hamilton
Private Bag 3205
Hamilton 3240
New Zealand

PO Number: 159106

Report Issued: 03-Mar-2023 **AsureQuality Reference: 23-56622** **Sample(s) Received:** 24-Feb-2023 08:20

Testing Period: 28-Feb-2023 to 03-Mar-2023
Date of analysis is available on request.

Results

The tests were performed on the samples as received.

Customer Sample Name: BH101 **Lab ID:** 23-56622-1

Sample Description: 3179333.1

Sample Condition: Acceptable **Sampled Date**: 21-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	105	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	97	%	AsureQuality Method (LC-MS/MS)
M8PFOS	107	%	AsureQuality Method (LC-MS/MS)
M4PFBA	102	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	103	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	104	%	AsureQuality Method (LC-MS/MS)
M8PFOA	94	%	AsureQuality Method (LC-MS/MS)
M9PFNA	105	%	AsureQuality Method (LC-MS/MS)
M6PFDA	98	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	113	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	100	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	97	%	AsureQuality Method (LC-MS/MS)
MPFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	111	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	95	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	103	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
DNMeFOSE	105	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	104	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	103	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	108	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	98	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: BH102 **Lab ID:** 23-56622-2

Sample Description: 3179333.2

Sample Condition: Acceptable **Sampled Date**: 21-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	0.040	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	105	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	96	%	AsureQuality Method (LC-MS/MS)
M8PFOS	100	%	AsureQuality Method (LC-MS/MS)
M4PFBA	99	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	102	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	104	%	AsureQuality Method (LC-MS/MS)
MPFHpA	103	%	AsureQuality Method (LC-MS/MS)
M8PFOA	95	%	AsureQuality Method (LC-MS/MS)
M9PFNA	102	%	AsureQuality Method (LC-MS/MS)
M6PFDA	92	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	126	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	107	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	114	%	AsureQuality Method (LC-MS/MS)
MPFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	110	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	95	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	103	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	86	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	98	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	103	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Q1 **Lab ID:** 23-56622-3

Sample Description: 3179333.3

Sample Condition: Acceptable **Sampled Date**: 21-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	101	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	94	%	AsureQuality Method (LC-MS/MS)
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	102	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	101	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	106	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	91	%	AsureQuality Method (LC-MS/MS)
M9PFNA	111	%	AsureQuality Method (LC-MS/MS)
M6PFDA	95	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	120	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	108	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	136	%	AsureQuality Method (LC-MS/MS)
MPFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	110	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	101	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	95	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	101	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	101	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	108	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	108	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: PFAS Trip Blank **Lab ID:** 23-56622-4

Sample Description: 3179333.4

Sample Condition: Acceptable **Sampled Date**: 21-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	92	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	84	%	AsureQuality Method (LC-MS/MS)
M8PFOS	76	%	AsureQuality Method (LC-MS/MS)
M4PFBA	95	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	97	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	95	%	AsureQuality Method (LC-MS/MS)
MPFHpA	86	%	AsureQuality Method (LC-MS/MS)
M8PFOA	84	%	AsureQuality Method (LC-MS/MS)
M9PFNA	91	%	AsureQuality Method (LC-MS/MS)
M6PFDA	81	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	69	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
MPFDoDA	73	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	93	%	AsureQuality Method (LC-MS/MS)
MPFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	91	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	92	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	78	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	84	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	98	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	104	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	97	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	90	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Dupl.of 23-56622-3A **Lab ID:** 23-56622-5

Sample Description: 21322639_Duplicate

Sample Condition: Acceptable **Sampled Date**: 21-Feb-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	111	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	94	%	AsureQuality Method (LC-MS/MS)
M8PFOS	105	%	AsureQuality Method (LC-MS/MS)
M4PFBA	106	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	107	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	108	%	AsureQuality Method (LC-MS/MS)
MPFHpA	106	%	AsureQuality Method (LC-MS/MS)
M8PFOA	91	%	AsureQuality Method (LC-MS/MS)
M9PFNA	109	%	AsureQuality Method (LC-MS/MS)
M6PFDA	99	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	115	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	108	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	141	%	AsureQuality Method (LC-MS/MS)
MPFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	111	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	114	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	105	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	117	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	110	%	AsureQuality Method (LC-MS/MS)

QC Results

Blank

Relates to sample(s) 23-56622-1, 23-56622-2, 23-56622-3, 23-56622-5

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	96	%	AsureQuality Method (LC-MS/MS)
M8PFOS	101	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	104	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	105	%	AsureQuality Method (LC-MS/MS)
MPFHpA	103	%	AsureQuality Method (LC-MS/MS)
M8PFOA	90	%	AsureQuality Method (LC-MS/MS)
M9PFNA	102	%	AsureQuality Method (LC-MS/MS)
M6PFDA	91	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	105	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	101	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	97	%	AsureQuality Method (LC-MS/MS)
MPFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	109	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	97	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	95	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	102	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	101	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	109	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	109	%	AsureQuality Method (LC-MS/MS)

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Relates to sample(s) 23-56622-4

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
Perfluoroalkylsulfonic acids			
PFPrS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Test	Result	Unit	Method Reference
mono-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	NR	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)

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Test	Result	Unit	Method Reference
Sum F-53B	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.0010	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	83	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	73	%	AsureQuality Method (LC-MS/MS)
M8PFOS	58	%	AsureQuality Method (LC-MS/MS)
M4PFBA	94	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	92	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	91	%	AsureQuality Method (LC-MS/MS)
MPFHpA	81	%	AsureQuality Method (LC-MS/MS)
M8PFOA	76	%	AsureQuality Method (LC-MS/MS)
M9PFNA	75	%	AsureQuality Method (LC-MS/MS)
M6PFDA	57	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	80	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	49	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	15 (R)	%	AsureQuality Method (LC-MS/MS)
MPFOSA	111	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	95	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	69	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	61	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	116	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	122	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	95	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	77	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	70	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	105	%	AsureQuality Method (LC-MS/MS)

R = Recovery outside method limits

Analysis Summary

Wellington Laboratory

Analysis	Method	Accreditation	Authorised by
Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water			
DX-PFCS01, 03-SUITE_B	AsureQuality Method (LC-MS/MS)	IANZ	Amelie Sellier

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Analysis	Method	Accreditation	Authorised by
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
DX-PFCS01, 05-HIGHLEVEL	AsureQuality Method (LC-MS/MS)	IANZ	Amelie Sellier

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.

NR = Not Reportable

Amelie Sellier

Scientist

Accreditation

Appendix

Analyte LOR Summary

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Listing applies to samples: 23-56622-4	
Perfluoroalkylsulfonic acids	
PFPrS	0.0010 µg/L
PFBS	0.0010 µg/L
PFPeS	0.0010 µg/L
di-PFHxS (1)	0.0010 µg/L
mono-PFHxS (1)	0.0010 µg/L
L-PFHxS (1)	0.0010 µg/L
Total PFHxS (3)	0.0010 µg/L
PFHpS	0.0010 µg/L
di-PFOS (5)	0.0010 µg/L
mono-PFOS (5)	0.0010 µg/L
L-PFOS (5)	0.0010 µg/L
Total PFOS (7)	0.0010 µg/L
Sum PFHxS+PFOS (1)	0.0010 µg/L
PFNS	0.0010 µg/L
PFDS	NR µg/L
PFECHS	0.0010 µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.0010 µg/L
PFPeA	0.0010 µg/L
PFHxA	0.0010 µg/L
PFHpA	0.0010 µg/L
PFOA	0.0010 µg/L
PFNA	0.0010 µg/L
PFDA	0.0010 µg/L
PFUnDA	0.0010 µg/L
PFDoDA	0.0010 µg/L
PFTrDA	NR µg/L
PFTeDA	0.0010 µg/L
P37DMOA	0.0010 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.0010 µg/L
NEtFOSA-M	0.0010 µg/L
NMeFOSA-M	0.0010 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.0010 µg/L
NMeFOSAA	0.0010 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.0010 µg/L
NMeFOSE-M	0.0010 µg/L
Telomere Sulfonic acids	
4:2 FTS	0.0010 µg/L
6:2 FTS	0.0010 µg/L
8:2 FTS	0.0010 µg/L
10:2 FTS	0.0010 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.0010 µg/L

FPePA (5:3FTA)	0.0010 µg/L
FHpPA (7:3FTA)	0.0010 µg/L
Miscellaneous	
F-53B (major)	0.0010 µg/L
F-53B (minor)	0.0010 µg/L
Sum F-53B	0.0010 µg/L
ADONA	0.0010 µg/L
HFPO-DA (GenX)	0.0010 µg/L

Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Listing applies to samples: 23-56622-1, 23-56622-2, 23-56622-3, 23-56622-5	
Perfluoroalkylsulfonic acids	
PFPrS	0.025 µg/L
PFBS	0.025 µg/L
PFPeS	0.025 µg/L
di-PFHxS (1)	0.025 µg/L
mono-PFHxS (1)	0.025 µg/L
L-PFHxS (1)	0.025 µg/L
Total PFHxS (3)	0.025 µg/L
PFHpS	0.025 µg/L
di-PFOS (5)	0.025 µg/L
mono-PFOS (5)	0.025 µg/L
L-PFOS (5)	0.025 µg/L
Total PFOS (7)	0.025 µg/L
Sum PFHxS+PFOS (1)	0.025 µg/L
PFNS	0.050 µg/L
PFDS	0.10 µg/L
PFECHS	0.025 µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.10 µg/L
PFPeA	0.10 µg/L
PFHxA	0.025 µg/L
PFHpA	0.025 µg/L
PFOA	0.025 µg/L
PFNA	0.025 µg/L
PFDA	0.025 µg/L
PFUnDA	0.025 µg/L
PFDoDA	0.10 µg/L
PFTrDA	0.10 µg/L
PFTeDA	0.10 µg/L
P37DMOA	0.050 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.025 µg/L
NEtFOSA-M	0.10 µg/L
NMeFOSA-M	0.10 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.025 µg/L
NMeFOSAA	0.025 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.10 µg/L
NMeFOSE-M	0.10 µg/L
Telomere Sulfonic acids	

4:2 FTS	0.025 µg/L
6:2 FTS	0.050 µg/L
8:2 FTS	0.10 µg/L
10:2 FTS	0.025 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.10 µg/L
FPePA (5:3FTA)	0.025 µg/L
FHpPA (7:3FTA)	0.025 µg/L
Miscellaneous	
F-53B (major)	0.10 µg/L
F-53B (minor)	0.050 µg/L
Sum F-53B	0.1 µg/L
ADONA	0.025 µg/L
HFPO-DA (GenX)	0.050 µg/L

Analyte Definitions

Poly- and Perfluorinated Alkyl Substances (PFAS) in Potable Water - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 23-56622-4	
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	

Analyte	Full Name
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[-1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Listing applies to samples: 23-56622-1, 23-56622-2, 23-56622-3, 23-56622-5	
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids

Analyte	Full Name
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[-1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid

AsureQuality Reference: 23-56622 **Report Issued:** 03-Mar-2023

Analyte	Full Name
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

LOR = Limit of Reporting LOD = Limit of Detection NR = Not Reportable

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

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

Certificate of Analysis

Client:	Beca Limited	**Lab No:**	3188433 SPv1
Contact:	Curtis Blyth C/- Beca Limited PO Box 448 Hamilton 3240	**Date Received:**	02-Mar-2023
		Date Reported:	29-Mar-2023
		Quote No:	96766
		Order No:	3936244-301
		Client Reference:	AA Groundwater
		Submitted By:	Curtis Blyth

Sample Type: Aqueous

Sample Name:		BH1 02-Mar-2023 12:00 pm	Q1 02-Mar-2023 12:00 pm	BH2 02-Mar-2023 12:00 pm
Lab Number:		3188433.1	3188433.2	3188433.4
Individual Tests				
Poly- and Perfluorinated Alkyl Substances in Water‡		See attached report	See attached report	See attached report
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn				
Dissolved Arsenic	g/m³	0.0141	0.0148	0.0012
Dissolved Cadmium	g/m³	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m³	0.0013	0.0012	< 0.0005
Dissolved Copper	g/m³	< 0.0005	< 0.0005	< 0.0005
Dissolved Lead	g/m³	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m³	0.0010	0.0014 #1	0.0009
Dissolved Zinc	g/m³	0.0015	0.0017	0.0047
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn				
Total Arsenic	g/m³	0.0155	0.0152	0.0026
Total Cadmium	g/m³	< 0.000053	< 0.000053	< 0.000053
Total Chromium	g/m³	0.0022	0.00193	0.00122
Total Copper	g/m³	< 0.00053	0.00060	< 0.00053
Total Lead	g/m³	0.00017	< 0.00011	< 0.00011
Total Nickel	g/m³	0.00103	0.00110 #1	0.00100
Total Zinc	g/m³	0.0018	0.0017	0.0050
BTEX in Water by Headspace GC-MS				
Benzene	g/m³	< 0.0010	< 0.0010	< 0.0010
Toluene	g/m³	< 0.0010	< 0.0010	< 0.0010
Ethylbenzene	g/m³	< 0.0010	< 0.0010	< 0.0010
m&p-Xylene	g/m³	< 0.002	< 0.002	< 0.002
o-Xylene	g/m³	< 0.0010	< 0.0010	< 0.0010
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq				
Acenaphthene	g/m³	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m³	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m³	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m³	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m³	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m³	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m³	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m³	< 0.0002	< 0.0002	< 0.0002

Sample Type: Aqueous				
Sample Name:		BH1 02-Mar-2023 12:00 pm	Q1 02-Mar-2023 12:00 pm	BH2 02-Mar-2023 12:00 pm
Lab Number:		3188433.1	3188433.2	3188433.4
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq				
Indeno(1,2,3-c,d)pyrene	g/m³	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m³	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m³	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m³	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water				
C7 - C9	g/m³	< 0.10	< 0.10	< 0.10
C10 - C14	g/m³	< 0.2	< 0.2	< 0.2
C15 - C36	g/m³	< 0.4	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	< 0.7	< 0.7	< 0.7

Analyst's Comments

‡ Analysis subcontracted to an external provider. Refer to the Summary of Methods section for more details.

#1 It has been noted that the result for the dissolved fraction was greater than that for the total fraction, but within analytical variation of the methods.

Appendix No.1 - AsureQuality Report

Summary of Methods

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

Sample Type: Aqueous			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Individual Tests			
Poly- and Perfluorinated Alkyl Substances in Water - High Level	Analysis by LC-MS/MS. Subcontracted to AsureQuality, Lower Hutt.	-	1-2, 4
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) 23rd ed. 2017.	-	1-2, 4
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 23rd ed. 2017.	-	1-2, 4
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017.	0.00005 - 0.0010 g/m³	1-2, 4
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 23rd ed. 2017 / US EPA 200.8.	0.000053 - 0.0011 g/m³	1-2, 4
BTEX in Water by Headspace GC-MS	Headspace GC-MS analysis. In-house based on US EPA 8260 and 5021.	0.0010 - 0.002 g/m³	1-2, 4
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq*	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m³	1-2, 4
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m³	1-2, 4
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m³	1-2, 4
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m³	1-2, 4
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m³	1-2, 4

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

Testing was completed between 08-Mar-2023 and 29-Mar-2023. For completion dates of individual analyses please contact the laboratory.

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

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

Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

AsureQuality Limited | 1C Quadrant Drive | Waiwhetu | Lower Hutt 5010 | Wellington | New Zealand
PO Box 31242 | Lower Hutt 5040 | Wellington | New Zealand
t. +64 4 570 8800 | e. cswellington@asurequality.com | w. www.asurequality.com

Certificate of Analysis

Submission Reference: EnvSubAQ_LH 726
Final Report

Environment Client Service Managers
Hill Laboratories - Hamilton
Private Bag 3205
Hamilton 3240
New Zealand

PO Number: 159150

Report Issued: 28-Mar-2023 **AsureQuality Reference: 23-65536** **Sample(s) Received:** 04-Mar-2023 10:10

Testing Period: 22-Mar-2023 to 28-Mar-2023
Date of analysis is available on request.

Results

The tests were performed on the samples as received.

Customer Sample Name: BH1 **Lab ID:** 23-65536-1

Sample Description: 3188433.1

Sample Condition: Acceptable **Sampled Date**: 02-Mar-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	102	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	102	%	AsureQuality Method (LC-MS/MS)
M8PFOS	101	%	AsureQuality Method (LC-MS/MS)
M4PFBA	100	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	100	%	AsureQuality Method (LC-MS/MS)
MPFHpA	102	%	AsureQuality Method (LC-MS/MS)
M8PFOA	110	%	AsureQuality Method (LC-MS/MS)
M9PFNA	104	%	AsureQuality Method (LC-MS/MS)
M6PFDA	103	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	92	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	105	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	96	%	AsureQuality Method (LC-MS/MS)
MPFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	98	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	106	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	101	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	106	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
DNMeFOSE	110	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	105	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	97	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	94	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	108	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: Q1 **Lab ID:** 23-65536-2

Sample Description: 3188433.2

Sample Condition: Acceptable **Sampled Date**: 02-Mar-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	103	%	AsureQuality Method (LC-MS/MS)
M8PFOS	102	%	AsureQuality Method (LC-MS/MS)
M4PFBA	104	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	103	%	AsureQuality Method (LC-MS/MS)
MPFHpA	105	%	AsureQuality Method (LC-MS/MS)
M8PFOA	109	%	AsureQuality Method (LC-MS/MS)
M9PFNA	117	%	AsureQuality Method (LC-MS/MS)
M6PFDA	107	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	109	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	107	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	109	%	AsureQuality Method (LC-MS/MS)
MPFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	105	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	112	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	112	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	96	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	107	%	AsureQuality Method (LC-MS/MS)

Customer Sample Name: BH2 **Lab ID:** 23-65536-3

Sample Description: 3188433.4

Sample Condition: Acceptable **Sampled Date**: 02-Mar-2023

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	100	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	105	%	AsureQuality Method (LC-MS/MS)
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	100	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	102	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	107	%	AsureQuality Method (LC-MS/MS)
MPFHpA	106	%	AsureQuality Method (LC-MS/MS)
M8PFOA	108	%	AsureQuality Method (LC-MS/MS)
M9PFNA	103	%	AsureQuality Method (LC-MS/MS)
M6PFDA	98	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	102	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	103	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	93	%	AsureQuality Method (LC-MS/MS)
MPFOSA	104	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	97	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	100	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	99	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	113	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	109	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	107	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	103	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	110	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	115	%	AsureQuality Method (LC-MS/MS)

QC Results

Blank

Relates to sample(s) 23-65536-1, 23-65536-2, 23-65536-3

Test	Result	Unit	Method Reference
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
Perfluoroalkylsulfonic acids			
PFPrS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFBS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFPeS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFHxS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFHxS (3)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
di-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
mono-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
L-PFOS (5)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Total PFOS (7)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Sum PFHxS+PFOS (1)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
PFDS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFECHS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluoroalkylcarboxylic acids			
PFBA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFPeA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFHxA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFHpA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFOA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFNA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFUnDA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
PFDoDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTrDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
PFTeDA	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
P37DMOA	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamides			
PFOSA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NEtFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSA-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoacetic acids			
NEtFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSAA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Perfluorooctanesulfonamidoethanols			
NEtFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
NMeFOSE-M	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Sulfonic acids			
4:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
6:2 FTS	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
8:2 FTS	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
10:2 FTS	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Telomere Carboxylic acids			
FPrPA (3:3FTA)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
FPePA (5:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
FHpPA (7:3FTA)	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
Miscellaneous			
F-53B (major)	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
F-53B (minor)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Sum F-53B	<0.10	µg/L	AsureQuality Method (LC-MS/MS)
ADONA	<0.025	µg/L	AsureQuality Method (LC-MS/MS)
HFPO-DA (GenX)	<0.050	µg/L	AsureQuality Method (LC-MS/MS)
Internal Standards			
M3PFBS	103	%	AsureQuality Method (LC-MS/MS)
M3PFHxS	107	%	AsureQuality Method (LC-MS/MS)
M8PFOS	103	%	AsureQuality Method (LC-MS/MS)
M4PFBA	105	%	AsureQuality Method (LC-MS/MS)
M5PFPeA	105	%	AsureQuality Method (LC-MS/MS)
M5PFHxA	101	%	AsureQuality Method (LC-MS/MS)

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Test	Result	Unit	Method Reference
MPFHpA	103	%	AsureQuality Method (LC-MS/MS)
M8PFOA	105	%	AsureQuality Method (LC-MS/MS)
M9PFNA	102	%	AsureQuality Method (LC-MS/MS)
M6PFDA	101	%	AsureQuality Method (LC-MS/MS)
M7PFUnDA	100	%	AsureQuality Method (LC-MS/MS)
MPFDoDA	105	%	AsureQuality Method (LC-MS/MS)
MPFTeDA	115	%	AsureQuality Method (LC-MS/MS)
MPFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNEtFOSA	102	%	AsureQuality Method (LC-MS/MS)
DNMeFOSA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSAA	100	%	AsureQuality Method (LC-MS/MS)
DNMeFOSAA	103	%	AsureQuality Method (LC-MS/MS)
DNEtFOSE	107	%	AsureQuality Method (LC-MS/MS)
DNMeFOSE	106	%	AsureQuality Method (LC-MS/MS)
M4:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M6:2FTS	102	%	AsureQuality Method (LC-MS/MS)
M8:2FTS	108	%	AsureQuality Method (LC-MS/MS)
M3HFPO-DA	104	%	AsureQuality Method (LC-MS/MS)

Analysis Summary

Wellington Laboratory

Analysis	Method	Accreditation	Authorised by
Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level			
DX-PFCS01, 05-HIGHLEVEL	AsureQuality Method (LC-MS/MS)	IANZ	Amelie Sellier

di-PFHxS (1) = Concentration determined using a branched di-PFHxS isomer standard (399>80 transition)

mono-PFHxS (1) = Concentration determined using a branched mono-PFHxS isomer standard (399>80 transition)

L-PFHxS (1) = Concentration determined using the linear PFHxS isomer standard (399>80 transition)

Total PFHxS (3) = The numerical sum of di-PFHxS (1), mono-PFHxS (1), and L-PFHxS (1)

di-PFOS (5) = Concentration determined using a branched di-PFOS isomer standard (499>80 transition)

mono-PFOS (5) = Concentration determined using a branched mono-PFOS isomer standard (499>80 transition)

L-PFOS (5) = Concentration determined using the linear PFOS isomer standard (499>230 transition)

Total PFOS (7) = The numerical sum of di-PFOS (5), mono-PFOS (5), and L-PFOS (5)

Sum PFHxS+PFOS (1) = The numerical sum of Total PFHxS (3) and Total PFOS (7)

Sum F-53B = The numerical sum of 9Cl-PF3ONS (F-53B major) and 11Cl-PF3OUdS (F-53B minor)

For all Totals, where a component is detected below the LOR, the value of zero is used in the calculation of the sum. The result represents the lower-bound concentration present in the sample.

Reported results are corrected for internal standard recovery

Results that are prefixed with '<' indicate the lowest level at which the analyte can be reported, and that in this case the analyte was not observed above this limit.

Amelie Sellier

Scientist

Accreditation

Appendix

Analyte LOR Summary

Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level - AsureQuality Method (LC-MS/MS)

Analyte	LOR
Perfluoroalkylsulfonic acids	
PFPrS	0.025 µg/L
PFBS	0.025 µg/L
PFPeS	0.025 µg/L
di-PFHxS (1)	0.025 µg/L
mono-PFHxS (1)	0.025 µg/L
L-PFHxS (1)	0.025 µg/L
Total PFHxS (3)	0.025 µg/L
PFHpS	0.025 µg/L
di-PFOS (5)	0.025 µg/L
mono-PFOS (5)	0.025 µg/L
L-PFOS (5)	0.025 µg/L
Total PFOS (7)	0.025 µg/L
Sum PFHxS+PFOS (1)	0.025 µg/L
PFNS	0.050 µg/L
PFDS	0.10 µg/L
PFECHS	0.025 µg/L
Perfluoroalkylcarboxylic acids	
PFBA	0.10 µg/L
PFPeA	0.10 µg/L
PFHxA	0.025 µg/L
PFHpA	0.025 µg/L
PFOA	0.025 µg/L
PFNA	0.025 µg/L
PFDA	0.025 µg/L
PFUnDA	0.025 µg/L
PFDoDA	0.10 µg/L
PFTrDA	0.10 µg/L
PFTeDA	0.10 µg/L
P37DMOA	0.050 µg/L
Perfluorooctanesulfonamides	
PFOSA	0.025 µg/L
NEtFOSA-M	0.10 µg/L
NMeFOSA-M	0.10 µg/L
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	0.025 µg/L
NMeFOSAA	0.025 µg/L
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	0.10 µg/L
NMeFOSE-M	0.10 µg/L
Telomere Sulfonic acids	
4:2 FTS	0.025 µg/L
6:2 FTS	0.050 µg/L
8:2 FTS	0.10 µg/L
10:2 FTS	0.025 µg/L
Telomere Carboxylic acids	
FPrPA (3:3FTA)	0.10 µg/L
FPePA (5:3FTA)	0.025 µg/L

FHpPA (7:3FTA)	0.025 µg/L
Miscellaneous	
F-53B (major)	0.10 µg/L
F-53B (minor)	0.050 µg/L
Sum F-53B	0.1 µg/L
ADONA	0.025 µg/L
HFPO-DA (GenX)	0.050 µg/L

Analyte Definitions

Poly- and Perfluorinated Alkyl Substances (PFAS) in Non Potable Water - High Level - AsureQuality Method (LC-MS/MS)

Analyte	Full Name
Perfluoroalkylsulfonic acids	
PFPrS	Perfluoro-1-propanesulfonic acid
PFBS	Perfluoro-1-butanesulfonic acid
PFPeS	Perfluoro-1-pentanesulfonic acid
di-PFHxS (1)	Total Perfluorodimethylbutane sulfonic acids
mono-PFHxS (1)	Total Perfluoromethylpentane sulfonic acids
L-PFHxS (1)	Linear Perfluorohexanesulfonic acid
PFHpS	Perfluoro-1-heptanesulfonic acid
di-PFOS (5)	Total Perfluorodimethylhexane sulfonic acids
mono-PFOS (5)	Total Perfluoromethylheptane sulfonic acids
L-PFOS (5)	Linear Perfluorooctanesulfonic acid
PFNS	Perfluoro-1-nonanesulfonic acid
PFDS	Perfluoro-1-decanesulfonic acid
PFECHS	Perfluoro-4-ethylcyclohexanesulfonic acid
Perfluoroalkylcarboxylic acids	
PFBA	Perfluoro-n-butanoic acid
PFPeA	Perfluoro-n-pentanoic acid
PFHxA	Perfluoro-n-hexanoic acid
PFHpA	Perfluoro-n-heptanoic acid
PFOA	Perfluoro-n-octanoic acid
PFNA	Perfluoro-n-nonanoic acid
PFDA	Perfluoro-n-decanoic acid
PFUnDA	Perfluoro-n-undecanoic acid
PFDoDA	Perfluoro-n-dodecanoic acid
PFTrDA	Perfluoro-n-tridecanoic acid
PFTeDA	Perfluoro-n-tetradecanoic acid
P37DMOA	Perfluoro-3,7-dimethyloctanoic acid
Perfluorooctanesulfonamides	
PFOSA	Perfluoro-1-octanesulfonamide
NEtFOSA-M	N-ethylperfluoro-1-octanesulfonamide
NMeFOSA-M	N-methylperfluoro-1-octanesulfonamide
Perfluorooctanesulfonamidoacetic acids	
NEtFOSAA	N-ethylperfluoro-1-octanesulfonamidoacetic acid
NMeFOSAA	N-methylperfluoro-1-octanesulfonamidoacetic acid
Perfluorooctanesulfonamidoethanols	
NEtFOSE-M	2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol
NMeFOSE-M	2-(N-methylperfluoro-1-octanesulfonamido)-ethanol
Telomere Sulfonic acids	
4:2 FTS	1H,1H,2H,2H-perfluoro-1-hexanesulfonic acid
6:2 FTS	1H,1H,2H,2H-perfluoro-1-octanesulfonic acid
8:2 FTS	1H,1H,2H,2H-perfluoro-1-decanesulfonic acid
10:2 FTS	1H,1H,2H,2H-perfluorododecanesulfonic acid
Telomere Carboxylic acids	
FPrPA (3:3FTA)	3-Perfluoropropyl propanoic acid

AsureQuality Reference: 23-65536 **Report Issued:** 28-Mar-2023

Analyte	Full Name
FPePA (5:3FTA)	3-Perfluoropentyl propanoic acid
FHpPA (7:3FTA)	3-Perfluoroheptyl propanoic acid
Miscellaneous	
F-53B (major)	9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid
F-53B (minor)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
Sum F-53B	Sum of F-53B components (major + minor)
ADONA	Dodecafluoro-3H-4,8-dioxanonanoic acid
HFPO-DA (GenX)	Tetrafluoro-2-(heptafluoropropoxy)propanoic acid
Internal Standards	
M3PFBS	Perfluoro-1-[2,3,4-13C3]butanesulfonic acid
M3PFHxS	Perfluoro-1-[1,2,3-13C3]hexanesulfonic acid
M8PFOS	Perfluoro-1-[13C8]octanesulfonic acid
M4PFBA	Perfluoro-n-[1,2,3,4-13C4]butanoic acid
M5PFPeA	Perfluoro-n-[1,2,3,4,5-13C5]pentanoic acid
M5PFHxA	Perfluoro-n-[1,2,3,4,6-13C5]hexanoic acid
MPFHpA	Perfluoro-n-[-1,2,3,4-13C4]heptanoic acid
M8PFOA	Perfluoro-n-[13C8]octanoic acid
M9PFNA	Perfluoro-n-[13C9]nonanoic acid
M6PFDA	Perfluoro-n-[1,2,3,4,5,6-13C6]decanoic acid
M7PFUnDA	Perfluoro-n-[1,2,3,4,5,6,7-13C7]undecanoic acid
MPFDoDA	Perfluoro-n-[1,2-13C2]dodecanoic acid
MPFTeDA	Perfluoro-n-[1,2-13C2]tetradecanoic acid
MPFOSA	Perfluoro-1-[13C8]octanesulfonamide
DNEtFOSA	N-ethyl-D5-perfluoro-1-octanesulfonamide
DNMeFOSA	N-methyl-D3-perfluoro-1-octanesulfonamide
DNEtFOSAA	N-ethyl-D5-perfluoro-1-octanesulfonamidoacetic acid
DNMeFOSAA	N-methyl-D3-perfluoro-1-octanesulfonamidoacetic acid
DNEtFOSE	2-(N-ethyl-D5-perfluoro-1-octanesulfonamido)ethan-D4-ol
DNMeFOSE	2-(N-methyl-D3-perfluoro-1-octanesulfonamido)ethan-D4-ol
M4:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-hexane sulfonic acid
M6:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-octane sulfonic acid
M8:2FTS	1H,1H,2H,2H-perfluoro-1-[1,2-13C2]-decane sulfonic acid
M3HFPO-DA	Tetrafluoro-2-(heptafluoropropoxy)-13C3-propanoic acid

LOR = Limit of Reporting LOD = Limit of Detection NR = Not Reportable

F

Appendix F – Result Assessment Tables

SOIL RESULTS ASSESSMENT TABLE - ALLIED ASPHALT							
Sample Date	31-Jan-23	31-Jan-23	31-Jan-23	31-Jan-23	Assessment Criteria		
Sample Name	**BH01 S1**	**BH01 S2**	**BH02 S1**	**BH02 S2**			
Lab Number	3165189.1	3165189.2	3165189.4	3165189.5	Background Concentration (mg/kg) [1]	Human Health (mg/kg) [3]	Environmental (mg/kg) [5]
Sample Depth (m bgl):	0.5	3	0.3	1.6			
Sample Soil Type:	Sand	Sand	Sand	Sand			
Heavy Metals (mg/kg)							
Arsenic	9	< 2	< 2	5	12.67	70	20
Cadmium	< 0.10	< 0.10	< 0.10	< 0.10	0.28	1,300	1.5
Chromium	4	3	5	4	60.5	6,300	80
Copper	< 2	< 2	6	< 2	40.17	>10,000	65
Lead	3.2	2.7	3.6	2.6	30.08	3,300	50
Mercury	< 0.10	< 0.10	< 0.10	< 0.10	†	4,200	0.15
Nickel	< 2	< 2	2	< 2	32.88	22,000 [2]	21
Zinc	16	5	24	14	101.8	350,000 [2]	200
BTEX in Soil by Headspace GC-MS (mg/kg dry wt)							
Benzene	< 0.05	< 0.05	< 0.05	< 0.05	-	3 [4]	-
Toluene	< 0.05	< 0.05	< 0.05	< 0.05	-	94 [4]	-
Ethylbenzene	< 0.05	< 0.05	< 0.05	< 0.05	-	180 [4]	-
m&p-Xylene	< 0.10	< 0.10	< 0.10	< 0.10	-	150 [4]	-
o-Xylene	< 0.05	< 0.05	< 0.05	< 0.05	-		-
Polycyclic Aromatic Hydrocarbons (PAH) (mg/kg dry wt)							
PAH (22 compounds)	< 0.3	< 0.3	< 0.3	< 0.3	-	-	-
1-Methylnaphthalene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
2-Methylnaphthalene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Acenaphthylene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	44
Acenaphthene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	16
Anthracene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	85
Benzo[a]anthracene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	261
Benzo[a]pyrene (BAP)	< 0.011	< 0.012	< 0.011	< 0.013	-	-	430
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	< 0.026	< 0.029	< 0.027	< 0.030	-	35	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Benzo[e]pyrene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Benzo[g,h,i]perylene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Benzo[k]fluoranthene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Chrysene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	384
Dibenzo[a,h]anthracene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	63
Fluoranthene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	600
Fluorene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	19
Indeno(1,2,3-c,d)pyrene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Naphthalene	< 0.06	< 0.06	< 0.06	< 0.07	-	190 [4]	160
Perylene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	-
Phenanthrene	< 0.011	< 0.012	< 0.011	< 0.013	-	-	240
Pyrene	< 0.011	< 0.012	< 0.011	< 0.013	-	NA [4]	665
Total Petroleum Hydrocarbons (TPH) (mg/kg dry wt)							
C7 - C9	< 20	< 20	< 20	< 20	-	500 [4]	-
C10 - C14	< 20	< 20	< 20	< 20	-	1700 [4]	-
C15 - C36	< 40	157	360	< 40	-	NA [4]	-
Total hydrocarbons (C7 - C36)	< 80	159	360	< 80	-	-	-

Annotations:

† Background concentrations are not available for mercury.

1 - Predicted Background Soil Concentrations - Pakihi Sandstone, Land Research Limited. 95th Percentile Background Concentration used.
https://lris.scinfo.org.nz/layer/470-pbc-predicted-background-soil-concentrations-new-zealand/

2 - United States EPA Regional Screening Level for an 'Industrial' land use. May 2022

3 - Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
Values applicable to Commercial/Industrial land use assessment criteria have been selected.

4 - Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand - Module 4, Table 4.11 (MAH/PAH), Table 4
Values applicable to 'Commercial/Industrial land use - All Pathways' for a Sandy Soil Type (most conservative) with a surface (<1 m) contamination depth have been selected.

5 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) - Recommended sediment quality guidelines - ISQG-Low adopted.

NA - indicates estimated criterion exceeds 20,000 mg/kg. At 20,000 mg/kg residual separate phase is expected to have formed in soil matrix.

Results above published background levels are underlined
Results exceeding human health screening criteria are shaded dark grey
Results exceeding environmental screening criteria are bold

PFAS in SOILS RESULTS ASSESSMENT TABLE - ALLIED ASPHALT							
Sample Name	**BH01 S1**	**BH01 S2**	**BH02 S1**	**BH02 S2**	**Assessment Criteria**		
Sample Depth (m)	0.5	3	0.3	1.6	**Human Health Criteria [1]**	**Ecological Criteria [2]**	**Landfill Acceptance Criteria [3]**
Description	Sand	Sand	Sand	Sand			
Assure Quality Sample ID	23-46936-1	23-46936-2	23-46936-3	23-46936-4			
Sample Date	31-Jan-23	31-Jan-23	31-Jan-23	31-Jan-23			
PFAS (mg/kg)							
Total PFOS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	-	1	-
Sum PFHxS+PFOS	< 0.0010	< 0.0010	< 0.0010	< 0.0010	20	-	20
PFOA	< 0.0010	< 0.0010	< 0.0010	< 0.0010	50	10	50

Annotations

1 - Table 2 in PFAS National Environmental Management Plan - Version 2.0 - January 2020. Values for a commercial/industrial scenario adopted.

2 - Table 3 in PFAS National Environmental Management Plan - Version 2.0 - January 2020. Values for Ecological direct exposure adopted.

Note that the source recognises that people's use of recreational water is not the same and therefore depending on screening, a locally appropriate guideline should be investigated.

3 - Table 7 in PFAS National Environmental Management Plan - Version 2.0 - January 2020. Values for an unlined landfill utilised (note these are not accepted for use in New Zealand).

PFAS Results - Quality Samples from Drilling		
	EQ BLANK (DRILLERS)	**WATER BLANK**
Description	Water collected off drill	Rinsate
Assure Quality Sample ID	23-46936-5	23-46936-6
PFAS (µg/L)		
Total PFOS (7)	< 0.0010	< 0.0010
Sum PFHxS+PFOS (1)	< 0.0010	< 0.0010
PFOA	< 0.0010	< 0.0010

GROUNDWATER RESULTS ASSESSMENT TABLE: ALLIED ASPHALT						
Sample Date	21-Feb-23	2-Mar-23	21-Feb-23	2-Mar-23	Assessment Criteria	
Sample Name	**BH01**		**BH02**		Human Health - DWSNZ 2022[1]	Environmental - ANZG Freshwater[2] 90% / 80%
Lab Number	3179333.1	3188433.1	3179333.2	3188433.4		
Total Heavy Metals (µg/L)						
Arsenic	14.8	15.5	2.4	2.6	200	42 / 140
Cadmium	< 0.053	< 0.053	< 0.053	< 0.053	4	0.4 / 0.8
Chromium	1.77	2.2	1.4	1.22	50	6.0 / 40
Copper	0.61	< 0.53	< 0.53	< 0.53	2000	1.8 / 2.5
Lead	0.16	0.17	< 0.11	< 0.11	100	5.6 / 9.4
Nickel	1.05	1.03	0.78	1	80	13 / 17
Zinc	2.6	1.8	3.4	5	1500	15 / 31
BTEX in Groundwater (µg/L)						
Benzene	< 1	< 1	< 1	< 1	10	1300 / 2000
Toluene	< 1	< 1	< 1	< 1	800	230 / 330
Ethylbenzene	< 1	< 1	< 1	< 1	300	110 / 160
m&p-Xylene	< 2	< 2	< 2	< 2	600	100 / 150
o-Xylene	< 1	< 1	< 1	< 1		470 / 640
Polycyclic Aromatic Hydrocarbons (PAH) (µg/L)						
Acenaphthene	< 0.02	< 0.1	< 0.02	< 0.1	-	1.5 / 7.0
Acenaphthylene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Anthracene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Benzo[a]anthracene	< 0.02	< 0.1	< 0.02	< 0.1	-	0.4 / 0.7
Benzo[a]pyrene (BAP)	< 0.02	< 0.1	< 0.02	< 0.1	0.7	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Benzo[g,h,i]perylene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Benzo[k]fluoranthene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Chrysene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Dibenzo[a,h]anthracene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Fluoranthene	< 0.02	< 0.1	< 0.02	< 0.1	-	1.7 / 2.0
Fluorene	< 0.02	< 0.2	< 0.02	< 0.2	-	-
Indeno(1,2,3-c,d)pyrene	< 0.02	< 0.1	< 0.02	< 0.1	-	-
Naphthalene	< 0.10	< 0.5	< 0.10	< 0.5	-	37 / 85
Phenanthrene	< 0.02	< 0.4	< 0.02	< 0.4	-	4.0 / 8.0
Pyrene	< 0.02	< 0.2	< 0.02	< 0.2	-	-
Total Petroleum Hydrocarbons (TPH) (µg/L)						
C7 - C9	< 100	< 0.10	< 100	< 0.10	18,000[3]	-
C10 - C14	< 200	< 0.2	< 200	< 0.2	350[3]	-
C15 - C36	< 400	< 0.4	< 400	< 0.4	-	-
Total hydrocarbons (C7 - C36)	< 700	< 0.7	< 700	< 0.7	-	-

Annotations

1 - Water Services (Drinking Water Standards for New Zealand) Regulations 2022 have been selected to provide human health guideline values Maximum acceptable values (MAVs) for dissolved metals on a conservative basis (only total metals were analysed)

2 - Australian and New Zealand Guidelines for Fresh Water Quality (2018). Values for 80% and 90% protection selected for comparison. https://www.waterquality.gov.au/anz-guidelines/guideline-values/default/water-quality-toxicants/searcl

3 - Ministry for the Environment Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand - Module 5, Table 5.2 - Potable use estimated health-based crtieria.

Results exceeding human health screening criteria are shaded dark grey

Results exceeding environmental screening criteria are bold

PFAS in GROUNDWATER RESULTS ASSESSMENT TABLE: ALLIED ASPHALT							
Sample Date	21-Feb-23	2-Mar-23	21-Feb-23	2-Mar-23	Assessment Criteria		
Sample Name	**BH01**		**BH02**		**Human health - Drinking water quality guideline value [1]**	**Human health - Recreational water quality guideline value [2]**	**Freshwater guideline value [3]**
Lab Number	23-56622-1	23-65536-1	23-56622-2	23-65536-3			
PFAS Suite (µg/L)							
PFOA	<0.025	<0.025	0.04	<0.025	0.56	10	220 / 1824
Total PFOS	<0.025	<0.025	<0.025	<0.025	-	-	0.13 / 31
Sum of PFOS and PFHxS	<0.025	<0.025	<0.025	<0.025	0.07	2	-

Annotations

1 - Water Services (Drinking Water Standards for New Zealand) Regulations 2022

2 - PFAS National Environmental Management Plan - Version 2.0 - January 2020 as sourced from Australian Government Department of Health 2019. The NEMP recognises that people's use of recreational water is not the same and therefore depending on screening, a locally appropriate guideline should be investigated

3 - PFAS National Environmental Management Plan - Version 2.0 - January 2020 as sourced from Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Technical draft default guideline values for PFOS and PFOA. Note that values for 99% / 95% / 90% / 80% species protection are presented. 'Detection' is considered more appropriate to be used for 99% species protection for PFOS as the guideline value for this is less than the laboratory level of detection.

Above drinking water quality guideline value
Above recreational water quality guideline value
Above 95 % species protection guideline value
Above 80 % species protection guideline value

Groundwater Quality Sample Results				
Sample type	**Q1 (BH01)**	**Trip Blank**	**Lab Duplicate of Q1**	**Q1 (BH01)**
Sample Date:	21-Feb-23	21-Feb-23	21-Feb-23	2-Mar-23
Assure Quality Sample ID	23-56622-3	23-56622-4	23-56622-5	23-65536-2
PFAS (µg/L)				
Total PFOS (7)	<0.025	<0.001	<0.025	<0.025
Sum PFHxS+PFOS (1)	<0.025	<0.001	<0.025	<0.025
PFOA	<0.025	<0.001	<0.025	<0.025

Preliminary Site Investigation (Contaminated Land)

Allied Asphalt, Aerodrome Road – Asphalt Plant Upgrades

Prepared for Allied Asphalt Limited
Prepared by Beca Limited

21 April 2023

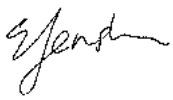
Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Emily Fensham	Final for Resource Consent	17/11/2022
2	Emily Fensham	Final – updated SQEP certification	21/04/2023

Document Acceptance

Action	Name	Signed	Date
Prepared by	Emily Fensham		21/04/2023
Reviewed by	Curtis Blyth & Sarah Shepherd *CEnvP (Contaminated Land Specialist)*		21/04/2023
Approved by	Jandre van Zyl		21/04/2023
on behalf of	Beca Limited		

This report has been reviewed by Sarah Shepherd, CEnvP Site Contamination Specialist. Sarah is a suitably qualified and experienced practitioner (SQEP) with over 17 years of experience managing and delivering a wide variety of environmental investigation works in New Zealand, Asia and the United Kingdom. She is experienced in regulatory compliance, oversight of environmental investigations, monitoring and risk assessment, contractor management, preparation and review of technical reports, as well as consultation with stakeholders and regulatory bodies. Sarah has been a Certified Environmental Practitioner Site Contamination Specialist since 2016.

I, Sarah Shepherd of Beca Ltd, certify that this PSI meets the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 because it has been:

- done by a suitably qualified and experienced practitioner, and
- reported on in accordance with the current edition of Contaminated land management guidelines No 1 – Reporting on contaminated sites in New Zealand, and
- the report is certified by a suitably qualified and experienced practitioner.

Executive Summary

Allied Asphalt Limited (Allied Asphalt) are proposing to replace an existing asphalt plant and undertake various upgrade works ('the project') at their Aerodrome Road site, Mt Maunganui ('the site'). Allied Asphalt commissioned Beca Ltd (Beca) to undertake a Preliminary Site Investigation (PSI) of the site to inform the activity status of the project under the National Environmental Standard for Assessing and Managing Contaminants in Soils to Protect Human Health (NESCS).

At a high level, the project involves the clearance of an area within the site, construction of a new asphalt plant and aggregate storage areas, and the decommissioning of the existing asphalt plant. The proposed area of the upgrades will involve an estimated soil disturbance of up to 1500 m^3 of soil disturbance associated with re-grading the existing hardfill surface, shallow building foundations and trenching for service connections.

A desk-based review of publicly available information sources and client supplied information was undertaken in conjunction with a site walkover.

Based on the information reviewed, Hazardous Activities and Industries List (HAIL) category E2 - asphalt or bitumen manufacture or bulk storage and the auxiliary category A17 - chemical and fuel storage associated with the asphalt manufacture process have occurred on the site, as well as HAIL A18 - Wood treatment, preservation or bulk storage associated with the historic use of the neighbouring property along the site's eastern boundary for timber treatment processes.

Soil disturbance is required on this 'piece of land' at a volume that exceeds the permitted activity (PA) provisions of Regulation 8(3) of the NESCS. Whilst remaining PA criteria outlined in Regulation 8 are anticipated to be achieved, because of the exceedance of PA soil volumes and the absence of a Detailed Site Investigation (DSI), a discretionary activity consent under Regulation 11 of the NESCS will be required. This discretionary activity pathway is the most appropriate given the challenges of sampling and assessing the aggregate material onsite which will be disturbed during the project. The majority of excavated hardfill will be reused for reforming the site surface or as product for reuse in roading infrastructure (recycled aggregate).

As no soil sampling has been undertaken to assess the presence of contaminants in soils, it is recommended consent as a restricted discretionary activity under DW R25 (Rule 35) of the Regional Natural Resources Plan (RNRP) for the disturbance of contaminated land is applied for.

A Contaminated Soils Management Plan (CSMP) is recommended to outline safe working practices for soil disturbance activities in the site, including emphasis on hygiene and minimising contact with potentially contaminated soil or dust, maintaining effective erosion and sediment controls, accidental discovery protocols and stockpile requirements. It is recommended that preparation and provision of a CSMP to Tauranga City Council is included as a condition of the resource consent.

It is recommended that soil sampling is undertaken of soil requiring offsite disposal to determine appropriate disposal during construction.

1 Introduction

Beca Limited (Beca) has been commissioned by Allied Asphalt Limited (Allied Asphalt) to undertake a contaminated land Preliminary Site Investigation (PSI) in regard to the proposed asphalt plant upgrades ('the project') at the Mount Maunganui Asphalt Plant at 54 Aerodrome Road, Mount Maunganui (the site).

1.1 Site Location and Description

The site is located within a property owned by Fulton Hogan Ltd, on Aerodrome Road. **Figure 1** and **Figure 2** below show the location and extent of the site of this investigation within the wider property.

Figure 1. Allied Asphalt Mount Maunganui Asphalt Site Location within Fulton Hogan property – local context (source: Bay of Plenty Regional Council Maps)

Figure 2. Approximate site extent (outlined red) within Fulton Hogan property (outlined yellow) (Source: Google Earth)

The site consists of the asphalt plant infrastructure, two large open aggregate storage sheds, site offices, outside aggregate storage areas and several shipping containers used for storage of miscellaneous product or samples from the asphalt making process. A single access point through the front Fulton Hogan yard allows access to the site for all vehicles. The current asphalt plant is situated in the central to north-eastern quarter of the site. **Figure 3** shows the asphalt plant in its current form for context. The site is predominantly surfaced with asphalt, with smaller areas of concrete and compacted hardfill.

Figure 3. Photo of current asphalt plant (Beca photo 2.6.22)

The neighbouring Fulton Hogan yard consists of activities associated with road construction and maintenance, including hazardous good storage, traffic management equipment, road marking equipment, general equipment, vehicle storage/parking, an engineering workshop, a geotechnical laboratory for pavement testing and general offices and car parking.

1.2 Asphalt Plant Proposed Upgrades

Allied Asphalt propose to construct and commission a new asphalt plant to the south of the existing one, switch production to the new plant, then decommission the old plant and realign site laydown and parking arrangements.

The proposal will also include a variety of yard layout changes to provide safer vehicle movements within the site and improve vehicle movement efficiencies.

The rationale for the upgrade includes:

- Lower emissions of air pollutants.
- Lower energy consumption.
- Lower greenhouse gas emissions.
- Alternative fuel capability.
- Site layout changes will enable improved health and safety outcomes.

Notable features of the new asphalt plant include:

- Increased production capacity.
- Improved production efficiency.
- Improved air discharge quality.
- Improved RAP capability.
- Manufacture of low energy asphalt (reduced mixing temperatures from 170^{o}C standard mix to 120^{o}C for low energy production).
- Specific active systems to control odour that operate independently & automatically from the rest of the plant operation.
- Duel fuel capability (natural gas and liquid fuel (e.g. diesel, bio diesel, waste oil)).
- Specific spray odour treatment systems for the load out area and baghouse stack.
- Real-time stack particulate monitoring.

Site plans provided in **Appendix A** display the current and proposed site layout configurations.

Earthworks associated with the project are minimal and will be restricted to the re-grading of the site (up to 200 mm deep) and excavations required for the new plant and building foundations and services. These works are expected to involve soil disturbance up to 1500 m^3, of which will primarily be the existing hardfill surface which will be retained onsite.

1.3 Purpose and Scope

The purpose of this PSI is:

- Through a review of desktop information and site walk over, identify land uses with the potential to cause land contamination within or immediately adjacent to the footprint of the proposed development;
- Identify any Hazardous Activity or Industry List (HAIL) sites[1], thus enabling the identification of areas that may require a detailed site investigation (i.e. soil and/or groundwater sampling); and

[1] As defined in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS)

- To inform any potential consenting requirements under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS) and the Bay of Plenty Regional Natural Resources Plan (RNRP).

The scope of works comprised the following:

- Review of selected historical aerial photographs obtained from Retrolens[2] and Google Earth;
- Review of the property file and information regarding land contamination held for the site from Tauranga City Council (TCC) and Bay of Plenty Regional Council (BoPRC);
- Review of the local geology and hydrogeology information;
- Review of information provided by Allied Asphalt including relevant site management plans and registers;
- A site inspection and interview with people knowledgeable of the site; and
- Preparation of this PSI report.

This assessment has been undertaken and reported in general accordance with:

- Ministry for the Environment (MfE) Contaminated Land Management Guidelines No.1 – Reporting on Contaminated Sites in New Zealand (2011).

[2] http://retrolens.nz/

2 Environmental Setting

The site is flat with the majority of stormwater onsite being either captured and reused in site processes or dust control, or discharged via a stormwater treatment interceptor at the eastern edge of the site (**Figure 4**). Stormwater is then discharged to the TCC stormwater network running through Aerodrome Road, prior to discharging to the Tauranga Harbour approximately 800m to the west. There is also an overland flow path running along the site's northern boundary which discharges in an open swale eastward, connecting to the stormwater network running down Aerodrome Road.

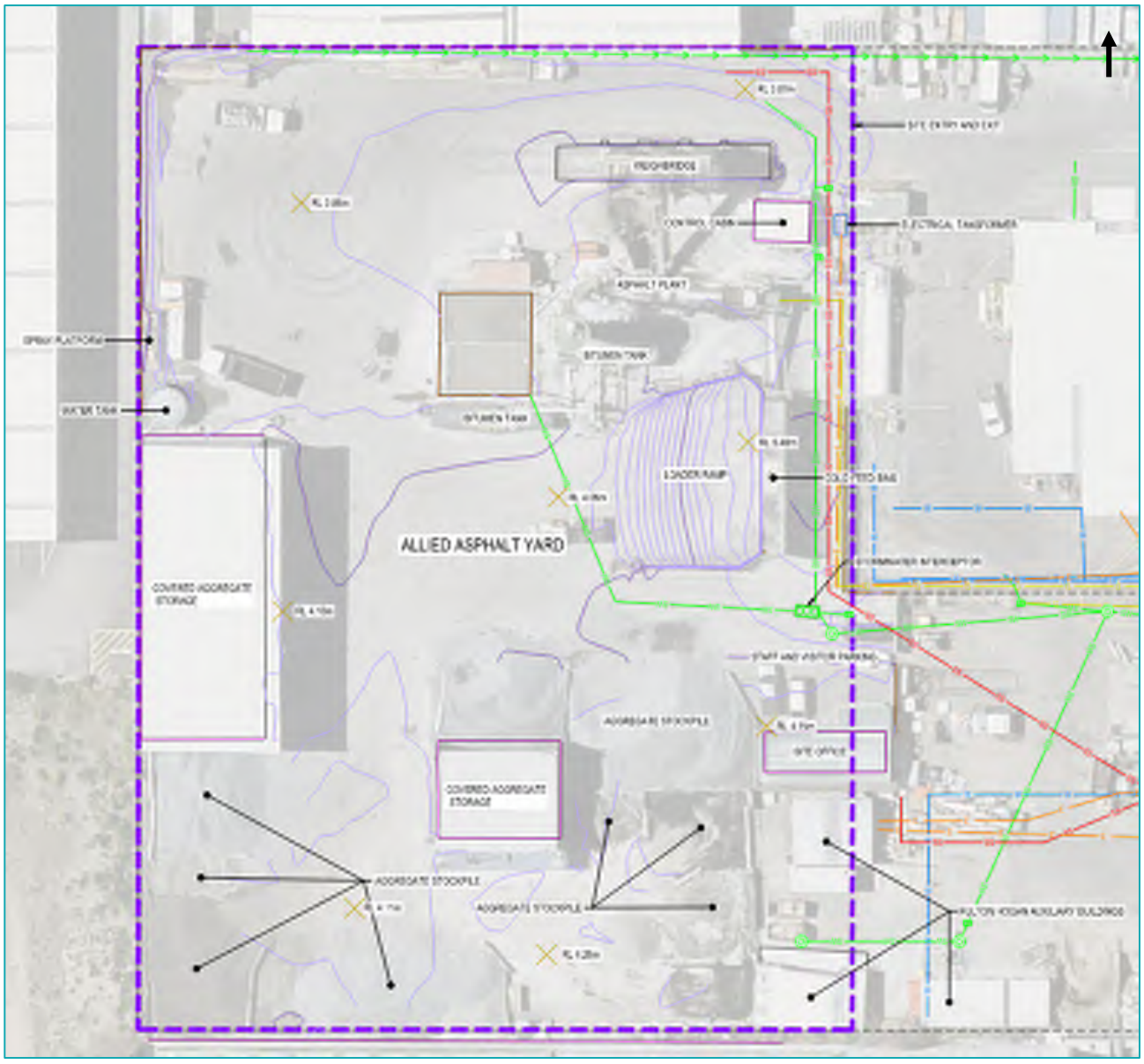


Figure 4. Indicative site extent (dashed purple) with internal site stormwater infrastructure and northern overland flow path (Beca Consenting Phase Design DWG-3936244).

A residential area is located approximately 660 m to the northeast, beyond State Highway 2 (Maunganui Rd) and the Tauranga Airport runway is located approximately 675 m to the south of the site. The site is located within an Industrial zone of the Tauranga City Plan and is surrounded by industrial and transport land uses.

2.1 Geology

The New Zealand Institute of Geological and Nuclear Science[3] indicates the site is underlain by the following geological unit:

- Beach sand, gravel and shell of the modern coastal plain; young marine terrace cover beds comprising gravel, sand, peat and mud.

The draft Preliminary Geotechnical Appraisal[4] for the project states that:

"*Indicative ground conditions at this site, based on the reviewed available information, are expected to comprise the following:*

- *Fill comprising imported gravel and asphalt mix is present from the ground surface to 0.9m depth.*
- *Buried original topsoil approximately 300mm in thickness is expected to be found variably between depths of 1.1m to 1.7m at this site.*
- *Tauranga Group coastal beach deposits, comprising loose to dense (typically medium dense) fine to coarse sand with beds of sandy silt/silt, are expected to be between depths of 0.6m to 12m.*
- *Holocene Swamp Deposits, containing firm to stiff clayey, silt, and organic silt layer approximately 11m thick can be expected between depths of 18m to 29m.*
- *Matua Subgroup, containing medium dense to dense silty sand can be expected to depths of 29m or more."*

It is anticipated that only the existing hardfill surface will be disturbed, with discrete areas of deeper excavation needed for service connections that may encounter sandy soils beneath.

2.2 Hydrology and Sensitive Receptors

The majority of stormwater from the site discharges via the stormwater interceptor at the site's eastern edge (**Figure 4**). Most of the work area in relation to this project will drain to this interceptor.

No watercourses exist within or near the area of works. Accordingly, there will be no direct discharges to natural water bodies during the proposed earthworks. The stormwater infrastructure runs perpendicular to the east of the site from the stormwater interceptor and into the public stormwater network along Aerodrome Road. The Services Plan is provided in **Appendix A**.

Based on available geotechnical information, groundwater at this site can be expected to range from 1.5m to 2.5m below ground level (bgl). Groundwater was encountered at 2.1 m bgl in an excavated borehole completed by Golder Associates in 2008[5] within the wider 48 Aerodrome property (immediately adjacent the site).

Review of the BoPRC GIS identified the closest consented water take[6] is associated with a property ~1 km to the northeast of the site.

[3] https://data.gns.cri.nz/geology/

[4] Mt Maunganui Asphalt Plant – Preliminary Geotechnical Appraisal; Beca Ltd; June 2022

[5] Site Validation Report. 48 Aerodrome Road, Mount Maunganui; Golder Associates; July 2008.

[6] Current Resource Consents BoPRC. https://gis.boprc.govt.nz/ConsentViewer/?appid=bbe761dd9e2f4e9da41ed9789220e8bc

3 Information Search

A summary of the information search and a discussion of the findings are provided in **Section 4** of this report. Refer to the plans provided in **Appendix A** for a site plan for locations referenced below.

3.1 Historical Aerial Photography

Historical aerial photography of the area was obtained for the project from Retrolens for the years between 1940 – 1982, and from Google Earth for the years between 2008 - 2021.

A review was undertaken for any observable land use changes within the site and broader land use changes of surrounding property that may assist in informing this investigation. A summary of key information from the aerial review is provided in **Table 1**.

Copies of the historical aerial photographs are included in **Appendix B.**

Table 1. Historical aerial photography review

Year	Historical aerial observations
1940	• The site is vacant grassed/vegetated land. • Aerodrome Road is present in the current alignment approximately 120 m to the east of the site and appears to be either gravel or dirt. • State Highway 2 (Hewletts Road) is present approximately 110 m to the north of the site. • All neighbouring land uses are either vacant grassed or vegetated paddocks.
1951	• A large building has been developed approximately 300 m to the south of the site, within what is now the Tauranga airport property. • The beginnings of a residential development approximately 900 m to the north, north-east of the site are evident. • The remainder of the aerial image is agricultural and vacant grassed area.
1969	• The northern half of the site has been developed into a commercial/ industrial site which appears to be timber storage. • Approximately 25% of the land within the historical aerial has been developed into commercial and industrial land use, predominantly to the north of the site. • The properties located directly to the north and south of the site are in the process of being developed into what appears to be a commercial/ industrial land use. • The Tauranga Airport runway has been developed approximately 500 m to the south, south-west of the site. • A small collection of residential plots has been developed approximately 160 m to the south of the site. • The eastern residential development is located over Maunganui Road approximately 650 m from the site.
1977	• The site appears to be used for stockpiling of material, with several buildings and what appears to be the first indication of a potential asphalt plant. • The wider property has now had a shed constructed, representative of the current shed on Fulton Hogan's site. • The properties to the north and south of the site are now developed into what appears to be a commercial use associated with storage and include buildings, sheds, and parking areas. • The property to the east, on the other side of Aerodrome Road, has been developed into what appears to be a commercial use. • The property west of the site remains vacant grassed land.

Year	Historical aerial observations
1986	• No significant changes to the site are evident in this aerial. • The property located directly to west and south-west of the site appears to have been developed into a commercial/industrial use. • No other significant changes have occurred to neighbouring properties or wider land uses.
1992	• No significant changes to the site are evident in this aerial. • Further development of the vacant properties approximately 230 m to the west of the site has occurred. • No other significant changes have occurred to neighbouring properties or wider land uses.
2016	• The sites current asphalt plant is present, and the remainder of the site appears to include storage tanks, aggregate bays, stockpiles, and sheds, similar to the configuration seen today. • The commercial/ industrial development of the surrounding area has intensified.

3.2 Council Information

3.2.1 Bay of Plenty Regional Council

BoPRC were contacted on 23 May 2022 in relation to information held on their Land Use Register regarding the site. The response from BoPRC is provided in **Appendix C**. The site is listed on the BoPRC Land Use Register as "Verified HAIL site", with the Land Use recorded as "*Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant."* The register references the first consent at the site in 1968 associated with the establishment of an asphalt plant.

No further information was provided in the BoPRC response.

3.3 Property File Review

The property files for 48 Aerodrome and 54 Aerodrome Road were requested from TCC in September 2021. The information included within the files has been reviewed for any details that may assist in understanding current and historic land uses at the site. Key information obtained from the property file review is summarised below in **Table 2**. Documents referred to can be provided on request.

Table 2 – Property file review summary

Date	Document Type	Key Information
April 1971	Building Consent	• Application for the storage of pillar aggregate in a silo. Location not identifiable on the site plan.
October 1997	Building Consent	• Application for the reposition and upgrade of the asphalt plant. • Includes the demolition of the existing plant. • Includes the installation of a new turbulent mass, continuous mix asphalt plant. • Asphalt plant operation and output expected to remain at existing level or less. • Site plan included indicates location to be further north within the site next to the sites eastern boundary.
1997	Building Consent	• Application for the installation of 3 x 55 tonne portable hot storage hoppers. Location not identifiable on the site plan.

Date	Document Type	Key Information
September 1999	Building Consent	• Application for a storage shed. • Site plan is not included so location within the site is unknown.
November 2000	Building Consent	• Construct truck-wash bay to replace existing. • Located to the east of the site within the Fulton Hogan yard.
November 2005	Building Consent	• Application for the installation of three portable hot storage hoppers. • Site plan is not included so location within the site is unknown.
December 2008	Building Consent	• Application for aggregate storage shed. • Stormwater from aggregate shed is to be disposed of in accordance with the design prepared by Radco NZ Ltd.
July 2008	Building Consent	• Application for Lime silo and base and associated fitting and screw conveyors to feed lime from the sile into the asphalt production plant. • Location of the silo within the plans are the same as the silos current location in the site (toward the northeast of the site).
March 2008	Site Validation Report	• An Environment Site Assessment[7] (ESA) was undertaken by Golder Associates in March 2008 on the northern half of the site which at the time was a part of the 48 Aerodrome Road property used as a timber treatment facility. • Soil samples were collected and analysed for heavy metals. • Arsenic and chromium concentrations were detected above the MfE 1997 Timber Treatment Guidelines[8] land use criteria for an unpaved industrial site which was attributed to the historical use of the site for timber treatment and treated timber storage. The location of exceedances were located approximately 20 m to the east of the site.
July 2008	Site Validation Report	• A Remediation Action Plan[9] (RAP) was prepared by Golder Associates in April 2008 for 48 Aerodrome Road to support resource consent which outlined site management and remediation options for contaminated soils. • Works were undertaken to remediate arsenic, chromium and copper impacted soils associated with the former timber treatment land use activities. • Works involved: – Excavation and off-site disposal of impacted soil – On-site validation of excavated areas – Preparation of the Site Validation Report[10] (SVR).

[7] Environmental Site Assessment – 48 Aerodrome Road, Mt Maunganui; Golder Associates Ltd; March 2008.

[8] Health and Environmental Guidelines for Selected Timber Treatment Chemicals; Ministry for the Environment and Ministry of Health; 1997.

[9] Remediation Action Plan and Assessment of Environmental Effects – 48 Aerodrome Road, Mount Maunganui; Golder Associates Ltd; April 2008.

[10] Site Validation Report - 48 Aerodrome Road, Mt Maunganui; Golder Associates Ltd; July 2008.

Date	Document Type	Key Information
		• Soils were excavated from three zones, with 'Zone 3' straddling the boundary of the site. Soils from Zone 3 were excavated to between 0.2 m and 1.7 m bgl yielding an approximate volume of 157 m^3. • The excavations were backfilled with coarse gravel (GAP65) and asphalt millings and the surface resealed. • Zone 3 validation results indicated two elevated concentrations of arsenic remaining (280mg/kg and 61mg/kg) that are on, or near, the eastern boundary of the site. • Post remediation of timber treatment associated soil contamination; "*the site no longer presented a risk to human health."* • The site was classified as "*remediated and suitable for commercial/industrial land use*" by TCC.
March 2009	Building Consent	• Application for aggregate bin storage shed.
December 2009	Building Consent	• Application to shift the stormwater drain and soakage pits and aggregate bin storage shed.
July 2021	Land Use Register letter	• This letter is linked to the ESA report by Golder Associates, March 2008. • The site associated with 48 Aerodrome Road on the Land Use Register is confirmed as *Contamination Acceptable/ Remediated.*

3.4 Site Observations and Walkover

A Beca Environmental and Geotechnical Engineer undertook a site walkover on 1 June 2022 with Allied Asphalt Plant Operations Manager, Brian Palmer. Site photographs from the walkover are provided as **Appendix D** The following observations were made:

- The site was operational at the time of the walkover, with truck movements to and from the aggregate areas only.
- The site surface is largely impervious, predominantly with asphalt and areas of concrete and compacted hardfill.
- An in-ground stormwater interceptor is present near the site offices that receives the majority of stormwater across the site. This interceptor treats stormwater prior to discharging to the stormwater network running down Aerodrome Road.
- Two water ponds are located near the asphalt plant which are used to supply the water required in the asphalt blending process. These ponds are supplemented by rainwater sourced from a nearby shed roof, as well as nearby sheet flow during rainfall events. If required, these ponds can be manually topped up with the domestic water supply. The overflow from these ponds is directed to the stormwater interceptor.
- A 50,000 litre (L) aboveground recycled-oil tank is located just outside the site's eastern boundary (on Fulton Hogan's site) that acts as the main supply of oil into the asphalt process.
- A transformer is located near this tank which did not have a date of manufacture located on it.
- A 'tool shed / workshop' is located near the entrance of the site within a shipping container. This container holds tools, equipment and small volumes of spray paints and sealants. The contents of the container were organised and tidy.
- A storage container for lime, small quantities of chlorine and asphalt product samples is located near the main asphalt plant stack. The lime and chlorine are used to balance the pH within the plant process. The container was well maintained and tidy.

- The aggregate storage area is hard surfaced and contains two large sheds with stockpiled aggregate underneath.
- Behind the smaller aggregate shed is another shipping container used for storage of asphalt plant material, including a fibre product used as a binder (in large bags) and miscellaneous oils and lubricants (between 10 L – 30 L containers) in a steel-bunded frame. The shed was well maintained and tidy.
- Behind the offices is a bunded area used to place sediment excavated from the two ponds to allow settlement and an area incorporated into the neighbouring Fulton Hogan yard for tool/equipment storage in shipping containers.
- The asphalt plant area was operational at the time of the walkover. The two large bitumen tanks in this area appeared in good condition. Small volumes of what appeared to bitumen could be seen as staining around several joints of the plant's piped infrastructure. An above ground 1250 L diesel tank is located near the centre of the plant and appeared in good condition with no staining evident on the site's surface nearby.

3.5 Client Provided Information

Allied Asphalt provided information regarding the site, including information pertaining to hazardous substances, the tradewaste system, various site plans, spill register and complaints register. The following provides a summary of the information reviewed:

- A Fleet Wash Operation and Maintenance Plan provided information on the wider property's wastewater discharges and trade waste system. In summary, the trade waste system is a closed system involving an interceptor and underground pipe infrastructure within the Fulton Hogan yard, removed from this site.
- Site plans were provided which detailed various services running through the site and wider property, including hazardous substance storage locations and hazardous substance classifications (**Appendix A**).
- Safety data sheets (SDS) were provided for the hazardous substances kept onsite. These SDSs contain standard information on the safety protocols required for the use and storage of each chemical.

4 Discussion

4.1 Summary of Information Search

Based on the property file documents and historical aerial photos the site has been used for its current asphalt-producing use since the 1970s.

Prior to this, a portion of land along the site's eastern boundary (associated with 48 Aerodrome Road) was used as a timber treatment facility. This area of the site was deemed to be "remediated and suitable for commercial/industrial land use" by TCC post remediation of contaminated soils by Golder Associates in 2008. This remediation targeted areas of neighbouring 48 Aerodrome Road site that contained exceedances of the MfE Timber Treatment Guidelines 1997. There remains a possibility that elevated contaminants associated with this land use (particularly arsenic and cadmium) are present along the eastern boundary of this site with the 48 Aerodrome Road property.

The site surface is largely impervious, with concrete, chipseal or compacted hardfill across the majority of the site. Previous geotechnical assessments show that this engineered hardfill surface extended to approximately 1m bgl, before transitioning to buried original topsoil and coastal beach deposits (sands).

The following HAIL activities have been identified on a 'more likely than not' basis as having had occurred within the site:

- A17 - Storage tanks or drums for fuel, chemicals or liquid waste.
- A18 - Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside.
- E2 - Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant).

The entire site is considered a "piece of land", as depicted in **Figure 5.**

Figure 5. Identified HAIL area and 'piece of land' associated with this project (image source Google Earth).

4.2 Exposure Pathway Assessment

A Conceptual Site Model (CSM) (**Table 3**) was developed to describe the relationship between sources of contamination, the human and environmental receptors that may be exposed to those contaminants in the context of the continued commercial/industrial land use of the site and its development, and the pathways by which those receptors may be exposed. A commercial/industrial land use has been chosen as the most appropriate for this assessment given the context of the upgrades and the site's continued asphalt plant use.

Table 3. Conceptual Site Model for the Site

Potential Contaminants of Concern	Receptor	Pathway	Pathway Complete?
Contaminants in soil and hardfill material derived from the asphalt plant process and other roading activities: • Heavy metals	Construction workers	Exposure of workers to contaminants in soils during the upgrade works – dermal contact, ingestion or inhalation of dust/vapours.	**Potentially Complete Pathway** - Contaminants could be present in areas of the proposed upgrade works that may pose a risk to human health and will require specific management and handling controls.

Potential Contaminants of Concern	Receptor	Pathway	Pathway Complete?
• Petroleum hydrocarbons • Polycyclic aromatic hydrocarbons (PAH) • Solvents	General public during construction phase of works	Exposure of the general public to contaminants in soils during upgrade works – dermal contact, ingestion or inhalation of dust/vapours.	**Incomplete Pathway** – Works within the site are fenced and secure from public access, therefore it is unlikely that a complete exposure pathway between the source of contaminants and the public is present.
	Future site users	Exposure of future site users to contaminants in soils – dermal contact, ingestion or inhalation of dust/vapours.	**Incomplete Pathway** – The project upgrade area will remain as either compacted hardfill or sealed surfaces so it is considered unlikely that a complete exposure pathway between the source of contaminants and future site industrial users would be present.
	Groundwater resources for public consumption	Leaching and migration of soil contaminants into groundwater	**Incomplete Pathway** – No information has been found during this investigation to suggest that potable water bores are located within a range to the site that would be presented a risk.
	Surface water	Sediment and runoff discharging into the nearby stormwater swale or stormwater infrastructure.	**Potentially Complete Pathway** – Contaminants may be present at levels that could pose a risk to environmental receptors if discharged to the stormwater system. Specific management controls such as a Project Erosion and Sediment Control Plan (ESCP), Environmental Management Plan (EMP) and reliance on the existing stormwater interceptor will be in place to manage this pathway.

5 Development Implications

5.1 Consenting

5.1.1 National Environmental Standard

The NESCS applies to land as per clause 5(7):

"Land covered:

(7) The piece of land is a piece of land that is described by 1 of the following:

(a) an activity or industry described in the HAIL is being undertaken on it

(b) an activity or industry described in the HAIL has been undertaken on it

(c) it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it."

The following HAIL categories have been identified to be occurring within the asphalt plant site:

- A17 - Storage tanks or drums for fuel, chemicals or liquid waste.
- A18 - Wood treatment or preservation including the commercial use of anti-sapstain chemicals during milling, or bulk storage of treated timber outside.
- E2 - Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant).

The 'piece of land' associated with this project is defined as the entire site, as outlined in **Figure 5.**

The requirements of the NESCS apply where the following activities ('trigger activities') are undertaken on the 'piece of land':

- Soil disturbance: Includes any soil disturbance such as scraping, levelling, trenching and earthworks.
- Fuel storage removal or replacement: Including replacing a whole system; removal or replacement of an underground part of the system; and/or taking away or returning soil that was associated with the removal or replacement of the system for the purpose of management, sampling, investigation, remediation or validation.
- Soil sampling: Sampling soil for the purposes of determining soil contaminant concentrations in the HAIL areas.
- Subdividing the land: Subdivision of the property including title changes.
- Changing land use to a use that reasonably likely to harm human health.

Soil disturbance will be required to regrade the site level, allow for the new concrete foundations for the proposed project works, as well as the installation of new service connections through open trenching.

Each trigger activity has a set of criteria, that if met, the works can be undertaken as a Permitted Activity (PA). If not, consent will be required from TCC under the NESCS for the proposed works. Under Regulation 8(3) of the NESCS, soil disturbance of up to 25 m^3 per 500 m^2 and disposal of up to 5 m^3 per 500 m^2 'piece of land' is allowed as a permitted activity (PA).

The maximum disturbance and disposal permitted activity thresholds for the 7,300 m^2 'piece of land' are 365 m^3 and 73 m^3 respectively. It is understood that excavated spoil material (mainly consisting of compacted hardfill) is proposed to be retained onsite. The estimated disturbance volume is up to 1500m^3 and therefore exceeds the PA threshold.

On the basis of the NESCS PA criteria for soil disturbance being exceeded, and no Detailed Site Investigation (DSI) being undertaken, consent as a discretionary activity under the NESCS will be required. This discretionary activity pathway is considered appropriate given the challenges of sampling and assessing

the aggregate material onsite which will be disturbed during the project and the final re-use of the majority of excavated hardfill to re-establish the hardfill surface or for recycled-aggregate product for reuse in roading infrastructure.

A Contaminated Soils Management Plan (CSMP) is recommended to outline safe handling procedures during the project, including the management of spoil, soil movements and accidental discovery protocol. It is proposed to include the requirement of a CSMP to be prepared and supplied to TCC within the conditions of consent.

5.1.2 Bay of Plenty Regional Natural Resources Plan

No analytical soil assessment has been conducted within the site to identify the potential risk associated with the disturbance of contaminated soils within the project footprint. The project involves soil disturbance and re-use of hardfill material excavated onsite, however the presence of soil contamination has not been assessed. As such, it is recommended consent as a restricted discretionary activity under DW R25 (Rule 35) of the RNRP is applied for conservatively.

5.2 Re-use of Material On-Site

It is understood that excavated material will be reused onsite where possible. If offsite disposal of the excavated material is required, soil sampling will need to be undertaken for waste classification purposes. Soil classification categories are as follows:

- Cleanfill material is defined by WasteMINZ (2018) as:

"Virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

  - *combustible, putrescible, degradable or leachable components;*
  - *hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown;*
  - *products or materials derived from hazardous waste treatment, stabilisation or disposal practices;*
  - *materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated;*
  - *contaminated soil and other contaminated materials; and*
  - *liquid waste.*

When discharged to the environment, clean fill material will not have a detectable effect relative to the background."

- Managed fill is soil containing contaminants that are below the maximum admissible concentrations for managed fill at local landfill sites, but above published background soil concentrations.
- Contaminated fill is soil containing concentrations above the maximum admissible concentrations for managed fill at local landfill sites.

The acceptance of material offsite facilities will be dependent on the Waste Acceptance Criteria of the identified disposal facility. Soil analytical results will likely be required to be provided to the nominated disposal facilities for review and confirmation of their acceptance of the material. Approval should be obtained from the landfill operator at the designated landfill prior to the material leaving the site.

6 Conclusions and Recommendations

This investigation has identified that the entire site associated with the proposed asphalt plant upgrade is a HAIL site. This classification is primarily associated with HAIL E2 - Asphalt or bitumen manufacture or bulk storage, with the auxiliary HAIL activity A17 associated with the storage of chemicals and fuels. HAIL A18 is also included as historic wood treatment and bulk storage has likely occurred along the site's eastern boundary.

Soil disturbance is required in the 'piece of land' at a volume which exceeds the PA provisions of Regulation 8(3) of the NESCS. Remaining PA criteria outlined in Regulation 8 are anticipated to be achieved during the construction of the new asphalt plant, however, on the basis of the exceedance of the PA soil disturbance volumes and having no DSI being undertaken, it is recommended consent as a discretionary activity under Regulation 11 of the NESCS is applied for.

As no soil sampling has been undertaken to assess the presence of contamination, it is recommended consent as a restricted discretionary activity under DW R25 (Rule 35) of the RNRP is applied for disturbance of contaminated land.

A CSMP is recommended to outline safe working practices with soil disturbance in the site including emphasis on hygiene and minimising contact with potentially contaminated soil or dust, maintaining effective erosion and sediment controls, accidental discovery protocol and stockpile requirements. It is recommended that the requirement of a CSMP to be produced and supplied to TCC is included as a condition within the project consent.

Spoil requiring offsite disposal will require sampling in order to classify the material for appropriate disposal.

7 Limitations

This report has been prepared by Beca Ltd (Beca) solely for Allied Asphalt (Client). Beca has been requested by the Client to provide a Preliminary Site Investigation (PSI) for the proposed construction of a new asphalt plant within their existing asphalt plant yard located off Aerodrome Road, Mt Maunganui. This report is prepared solely for the purpose of the assessment of potential soil contamination within the proposed works area (Scope). The contents of this report may not be used by the Client for any purpose other than in accordance with the stated Scope.

This report is confidential and is prepared solely for the Client. Beca accepts no liability to any other person for their use of or reliance on this report, and any such use or reliance will be solely at their own risk.

Unless specifically stated otherwise in this report, Beca has relied on the accuracy, completeness, currency, and sufficiency of all information provided to it by, or on behalf of, the Client or any third party, and has not independently verified the information provided. Beca accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the information provided. Publicly available records are often inaccurate or incomplete.

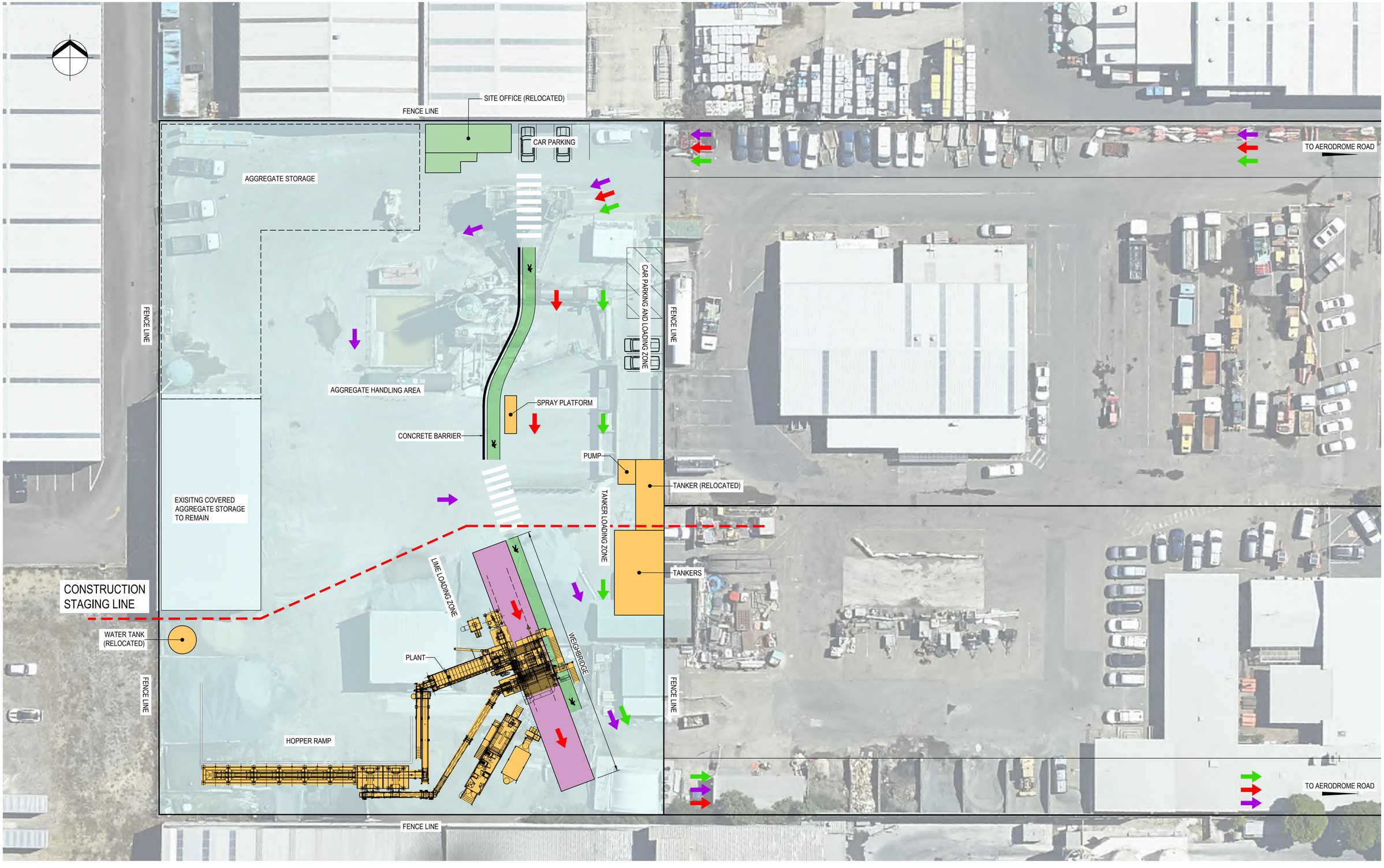
The contents of this report are based upon our understanding and interpretation of current legislation and guidelines (“Standards”) as consulting professionals, and should not be construed as legal opinions or advice. Unless special arrangements are made, this report will not be updated to take account of subsequent changes to any such Standards.

This report should be read in full, having regard to all stated assumptions, limitations, and disclaimers.

A

Appendix A – Site Overview Plans and Designs

Drawing Plotted: 20 May 2022 3:22 pm



TANKER TRUCK FLOW

AGGREGATE TRUCK FLOW

ASPHALT TRUCK FLOW

CONCEPT DESIGN
NOT FOR CONSTRUCTION

No.	Revision	By	Chk	Appd	Date
A	FOR INFORMATION	JWS	JVZ	JVZ	06.05.22

Original Scale (A1)	1:250	Reduced Scale (A3)	1:500

Design	JWS	APR 22	Approved For Construction*
Drawn	JWS	APR 22	
Dsg Verifier	JVZ	APR 22	
Drg Check	JVZ	APR 22	Date

* Refer to Revision 1 for Original Signature

Client: ALLIED ASPHALT

Project: MT MAUNGANUI ASPHALT PLANT

Title: SITE LAYOUT CONSTRUCTION PHASING STAGE 2 - OPTION 1

Discipline: CIVIL

Drawing No.: 3936244-SK2

Rev.: A

Document No.: 3936642 SITE MASTERPLAN.DWG

www.beca.com

DO NOT SCALE FOR SET OUT DIMENSIONS

NORTH

STORMWATER INTERCEPTER

FENCE

EDGE OF SEAL

STORMWATER SOAKHOLE (0.7m DEEP)

UNKNOWN SERVICE

GATE

DRIVEWAY

AERODROME RD

FENCE

WORKSHOP BUILDING

FENCE BLOCKWALL

50mm PVC

CONTAINMENT AREA FOR LOADED TRAILERS

END OF WATER LINE UNDEFINED

TO ALLIED ASPHALT (Location Indicative only)

WATERMETER

32mm MDPE

CONTAINMENT AREA CONTROL VALVE

UNDERGROUND POWER

WASHBAY

32mm MDPE

RETAINED AGGREGATE AREA

SEDIMENTATION TANKS

PUMP STATION

SEWER UPSTAND

WATERMETER

32mm MDPE IN DAILY DUCT

KERB LINE

BUILDING

COURTYARD

OFFICE BUILDING

AGGREGATE BIN DIVIDERS

PORTACOM

TOILETS & SHOWER

WATERMETER

STORAGE BUILDINGS

KEY

- LIGHT POLE
- E — UNDERGROUND POWER
- W — WATER MAIN
- SW — STORMWATER
- SS — SANITARY SEWER
- / — FENCE

NOTE

UNDERGROUND FEATURES ON THIS PLAN HAVE COME FROM CONTRACTORS RECORDS.

POSITIONS OF SOME SERVICES MAY NOT HAVE BEEN ACCURATELY LOCATED (GPR SURVEY)

ENSURE CABLES ARE LOCATED BEFORE DIGGING

Surveyed by	J.McKAY
Designed by	
Drawn by	KJM
Date Printed	APRIL 2011

Fulton Hogan

FULTON HOGAN
BAY OF PLENTY

54 AERODROME RD
MOUNT MAUNGANUI
YARD ASBUILT AND SERVICES

Scales	1:500
Drawing No.	1 OF 1
Drawing Status	VERSION 1 – CURRENT 26/02/08
Revision No.	1

B

Appendix B – Historical Aerial Images

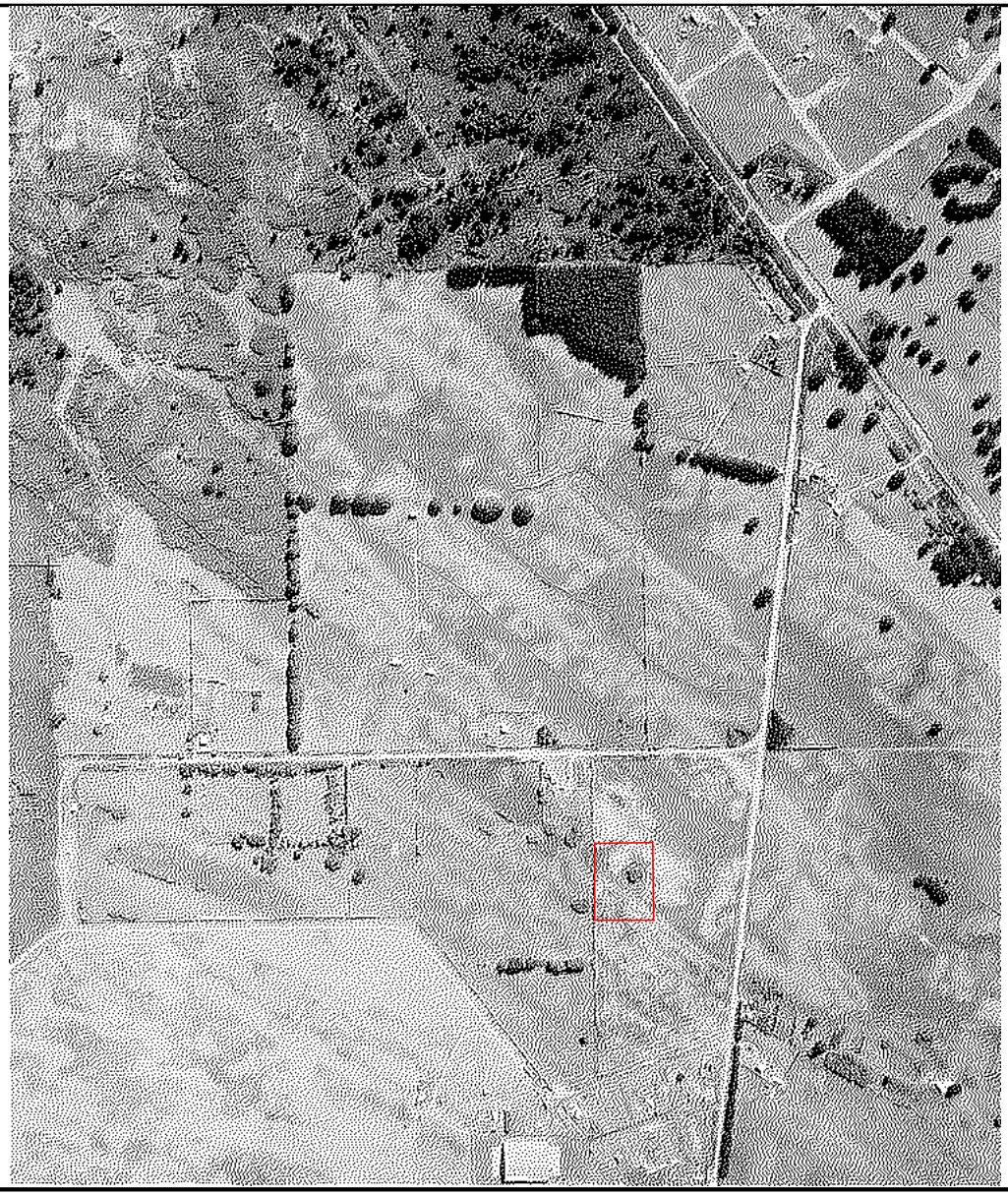
Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1940 (Image Sourced from Retrolens)

0 245 490

Metres

JHV

Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1951 (Image Sourced from Retrolens)



0 510 1020

Metres

JHV

Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1969 (Image Sourced from Retrolens)

Beca

0 250 500

Metres

JHV

Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1977 (Image Sourced from Retrolens)

Beca

0 340 680

Metres

JHV

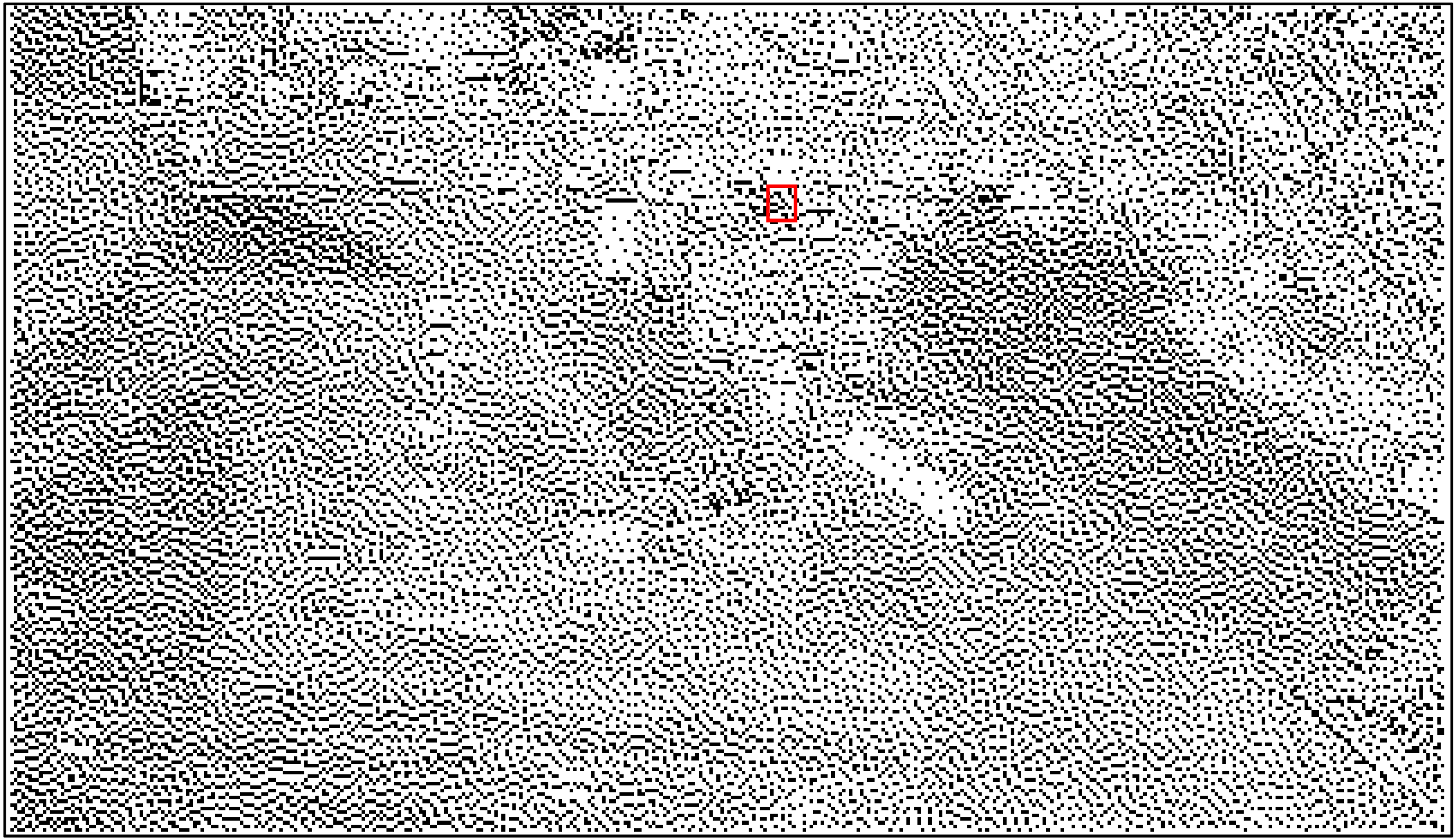
Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1986 (Image Sourced from Retrolens)

0 910 1820

Metres

JHV

Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 1992 (Image Sourced from Retrolens)



Beca

0 780 1560

Metres

JHV

Site Address: 54 Aerodrome Road, Mount Maunganui
Aerial Imagery: 2016 (Image Sourced from Google Earth)

Beca

0 115 230

Metres

JHV

C

Appendix C – Council Information

Emily Fensham

From: Land Use Communication <LandUseCommunication@boprc.govt.nz>
Sent: Tuesday, 24 May 2022 9:55 am
To: Emily Fensham
Subject: RE: HAIL request

Dear Emily

RE: Site Contamination Enquiry for **54 Aerodrome Road, Mount Maunganui**

Thank you for your enquiry. We can confirm that the site is registered on the Bay of Plenty Regional Council's Land Use Register and classified as a **Verified HAIL site**. The record ID is **LUR-TGA-00027**.

Please find attached a Site Details Report which includes information specific to the site and a Map showing the location of the activity or industry.

To support the identification of land that may be contaminated, the Ministry for the Environment (MfE) has compiled a list of activities and industries that are considered likely to cause land contamination. This list is called the Hazardous Activities and Industries List (most commonly referred to as the HAIL) and is intended to identify most situations in New Zealand where hazardous substances could cause land contamination. For more information on the MfE HAIL please visit their website HERE.

The Bay of Plenty Regional Council's Land Use Register has been developed to try and identify where many of the activities and industries listed on the MfE HAIL have taken place or are taking place within the Region. However, the information we hold may not exhaustive and therefore we recommend you also contact **Tauranga City Council**, which may hold additional information about this site that we are not aware of yet.

If you wish to discuss the matter further, please email LandUseCommunication@boprc.govt.nz.

Yours faithfully

The Land Use Register Team
Bay of Plenty Regional Council Toi Moana

From: noreply@boprc.govt.nz <noreply@boprc.govt.nz>
Sent: Monday, 23 May 2022 10:36 am
To: Web Info Requests <WebInfo.Requests@boprc.govt.nz>; Zendesk Contact Centre <support@boprc.zendesk.com>
Subject: HAIL request

Online submission

The form Hail/Property request form was submitted, this is the list of values it contained.

The following details were submitted:

Contact name	Emily Fensham

Company name (if applicable)	Beca
Postal address	2 Garden Place, Hamilton Central, Hamilton, New Zealand, 3204
Phone	021790645
Email address	emily.fensham@beca.com
Address of property of interest	54 Aerodrome Road Mount Maunganui. Lot 2 DPS 36408
Site owner (if known)	Fulton Hogan
Additional comments	Lot 2 DPS 36408

Land Use Site Details

Site ID :	LUR-TGA-00027	Printed :	24/05/2022

Site Address(es) :	54 Aerodrome Road, Tauranga City
Parcel(s)/Lot(s) :	4420473 : Lot 2 DPS 36408
Site Classification :	Verified HAIL site

Description

The land use history has been confirmed. The site has been confirmed as one that appears on the Hazardous Activities and Industries List (https://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail). The information used in making this classification of the site contamination status is available in file P275-54-9 held by Tauranga City and file 7000-06-T27 held by Bay of Plenty Regional Council.

Land Use

Asphalt or bitumen manufacture or bulk storage (excluding single-use sites used by a mobile asphalt plant)

Site Information

Consent 30007 begins in 1968 with the plans to establish an asphalt plant, contains correspondence dealing with air discharge pollution complaints under the Clean Air Act, 1972, which were responded to by the Department of Health, Air Pollution Control Department and the premises was issued with an ongoing series of Licence to Carry on a Scheduled Process which was the manufacturing of hot mix asphalt paving mixes at the Aerodrome Road site. Ultimately under a change of legislation, a Resource Consent # 30007 was issued for discharge to air from the manufacturing processes. This consent was allowed to expire. Consent # 30083 Discharge of Treated Gases and Particulate Matter to Air was issued on 8 February 1996 to expire on 30 November 2005. This consent was then replaced on 26 July 2005 by consent number 62740 (Vol. 1 & 2) which is currently valid for this site.

Other Information

The enclosed information is derived from the Tauranga City Council and Bay of Plenty Regional Council's Selected Land Use register and is made available to you under the Local Government Official and Information Meetings Act 1987 (LGOIMA), Building Act 1991 or Privacy Act 1993.

The database has been established by the Tauranga City Council and Bay of Plenty Regional Council for the purpose of performing its functions under the Resource Management Act 1991.

It has been compiled in accordance with national Site Classification and Information Management Protocols for Land Contamination.

This information reflects the Tauranga City Council and Bay of Plenty Regional Council's current understanding of this site. The Tauranga City Council, the Bay of Plenty Regional Council and their officers, employees and agents accept no liability for any inaccuracy in, or omission from, this information; or liability for any loss of damage suffered by any person which may directly or indirectly result from any person acting or refraining from acting on this information. This information has been prepared for the recipient to whom it is addressed and is intended for the recipient's use only. This is not intended to be relied on by any other party. The provisions of the Privacy Act 1993 bind the recipient of this information.

D

Appendix D – Site Photography

Photo 1: Aggregate Bay storage sheds one located in the middle of the south end of the site (left) and the other located along the western site boundary (centre).

Photo 2: The current asphalt plant located towards the north-eastern corner of the site includes two bitumen storage tanks which are located to the west of the Lime silo.

Photo 3: Portable hot storage hoppers and ramp located mid-way along the site's eastern boundary.

Photo 4: Hot Bitumen tank located directly to the east of the silo.

Photo 5: Bitumen tank located directly to the south of the catch pond connected to the asphalt plant.

Photo 6: Two empty 1000 L chemical containers atop a storage container.

Photo 7: The aggregate bay and stockpile located along the sites western boundary.

Photo 8: South-eastern corner of the site containing a drying area for sediments from the overflow pond (centre of image) and maintenance area storing tools (the far right) against the southern site boundary.

Photo 9: Aggregate stockpiles within the south-western corner of the site.

Photo 10: Bags of cellulose fibres used for asphalt production stored in shipping container located on the eastern site boundary beside the entrance.

Photo 11: Overview of the asphalt plant looking towards the east. Asphalt plant including retention ponds, bitumen tanks, and lime silo in the foreground and portable hot storage hoppers in the background.

Photo 12: Rainwater tank and skip bin used for site waste such as plastic bags. Storage of 400 L bitumen release behind the water tank.

Photo 13: Truck wash station with white water tank and blue 400 Litre container of Bitumen release product. This is located outside the site.

Photo 14: Assortment of 20 L containers of lubricants, oils, paints, for maintenance purposes stored with a metal storage bin located in the workshop container at the eastern site boundary beside the entrance.

Photo 15: Water retention ponds located directly to the west of the asphalt plant and directly north of the black bitumen tank.

Photo 16: Assorted solutions and industrial chain lubricants in spray cans stored in shed located in workshop container.

Photo 17: Bags of Soda Ash stored below asphalt quality control samples (labelled boxes) and assorted tools within storage container.

Photo 18: Empty LPG bottle storage area for pick up. Located in the top east corner of the site.

Photo 19: Electrical transformer located on the eastern boundary of the site beside the asphalt plant.

Photo 20: Asphalt plant including LPG bottles present and black 1250 L Diesel drum beneath the asphalt mixing drum.

Photo 21: White 50,000 Litre tank containing refined (waste) oil. Located directly outside the site boundary to the east in close proximity to the asphalt plant.

Photo 22: Site office and carpark area located in beside the eastern site boundary towards the middle of the site.