

Client

Name Aurecon NZ limited

Address Te Ahi level 3 / 110 Carlton Gore road
New market, Auckland

Phone 021 08534125 Fax

Client Reference 521290-064

Quote No 126272 Order Number

Primary Contact Tiana Hill 298786

Submitted By Andrew Allcock

Charge To Aurecon NZ limited. 32359

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

- ☒ Email Primary Contact ☒ Email Submitter
☒ Other nzenlabs@aurecongroup.com

ADDITIONAL INFORMATION

Esdal files please.
Please advise before disposal

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	BH45- 1050 4-0.5	19-08-2024	Soil	HM(7), TPH, PAH, Asb
2	BH45-1.4-1.6	19-08-2024	Soil	HM(7), TPH, PAH, Asb
3	BH45-0.8-1.0	19-08-2024	Soil	HM(7), TPH, PAH, Asb
4	BH51-5.0-5.45	15-08-2024	Soil	HM(7)
5	BH51-8.0-8.45	15-08-2024	Soil	HM(7)
6	BH51-12.0-12.33	15-08-2024	Soil	HM(7)
7				
8				
9				
10				

ANALYSIS REQUEST

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

Job No: Date Recv: 22-Aug-24 17:59

365 5467

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

Received by: May Alfante



CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories	Date & Time:
☒ Please tick if you require COC to be faxed back	Name:
	Signature:
Received at Hill Laboratories	Date & Time:
	Name:
	Signature:
Condition	Temp.
☐ Room Temp ☐ Chilled ☐ Frozen	16.1 °C
☐ Sample Analysis details checked	
Signature:	

Priority

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

Requested Reporting Date:

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3655467
Contact:	Andrew Allcock	Date Registered:	22-Aug-2024 6:07 pm
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290 - 064
		Add. Client Ref:	Sampled: 19/08/24
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date:	27-Aug-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH46_0.4-0.5	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil
2	BH46_1.4-1.6	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil
3	BH45_0.8-1.0	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-3
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-3
Moisture	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-3
Sample Fraction >10mm	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Sample Fraction <10mm to >2mm	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Sample Fraction <2mm	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-3
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-3
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos in ACM as % of Total Sample	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Weight of Asbestos as Fibrous Asbestos (Friable)	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Fibrous Asbestos as % of Total Sample	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Weight of Asbestos as Asbestos Fines (Friable)	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Asbestos Fines as % of Total Sample	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3



Hill Laboratories

TRIED, TESTED AND TRUSTED

Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.
BH46_01 GW samples - can these please be put on a separate COC + with same quote # and client reference please :)

ANALYSIS REQUEST

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

Job No: Date Recv: 28-Aug-24 12:57

365 8961

Received by: Olivia Tod



3136589615

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories Date & Time: 27.08.2024

Name: T. Hill

☒ Tick if you require COC to be emailed back Signature: [Signature]

Received at Hill Laboratories Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen Temp: 18.5

☐ Sample and Analysis details checked

Signature:

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	BH46_3.5-3.6	23.08.24	—	Soil	HM(7), TPH, PAH, Asb
2	BH46_8.5-8.7	23.08.24	—	Soil	HM(7)
3	BH46_12.0-12.1	23.08.24	—	Soil	HM(7)
4	BH46_01	28.08.24	—	Water	SVOCs, TSS, Dis HM, PAH, TPH
5	BH25_0.2-0.3	26.08.24	—	Soil	HM(7), TPH, PAH, Asb
6	BH25_1.5-1.6	26.08.24	—	Soil	HM(7)
7					
8					
9					
10					
11					
12					

Continued on next page

Could this water sample please be on a separate COC but same quote # and ref #

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3658961
Contact:	Tiana Hill	Date Registered:	28-Aug-2024 1:15 pm
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	Sampled 26/08/24
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date:	30-Aug-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH25_0.2-0.3	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil, Asbestos in Soil ESdat Electronic Transfer

Summary of Methods

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

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Weight of Asbestos as Asbestos Fines (Friable)	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Asbestos Fines as % of Total Sample	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Asbestos in Soil ESdat Electronic Transfer			
Amosite	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0 Detect	1
Chrysotile	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0 Detect	1
Crocidolite	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0 Detect	1



Hill Laboratories

TRIED, TESTED AND TRUSTED

Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.

BH46-01 GW samples - can these please be put on a separate COC + with same quote # and client reference please :)

ANALYSIS REQUEST

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

Job No: Date Recv: 28-Aug-24 12:58

365 8963

Received by: Olivia Tod



3136589639

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 27.08.2024

Name: T. Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp:

18.5

☐ Sample and Analysis details checked

Signature:

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	BH46_3.5-3.6	23.08.24	—	Soil	HM(7), TPH, PAH, Asb
2	BH46_8.5-8.7	23.08.24	—	Soil	HM(7)
3	BH46_12.0-12.1	23.08.24	—	Soil	HM(7)
4	BH46-01	28.08.24	—	Water	SVOCs, TSS, Dis HM, PAH, TPH
5	BH25_0.2-0.3	26.08.24	—	Soil	HM(7), TPH, PAH, Asb
6	BH25_1.5-1.6	26.08.24	—	Soil	HM(7)
7					
8					
9					
10					
11					
12					

Continued on next page

Could this water sample please be on a separate COC but same quote # and ref #

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3658963
Contact:	Tiana Hill	Date Registered:	29-Aug-2024 11:16 am
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date*:	02-Sept-2024 4:30 pm

* As the samples require analysis at a Hill Labs location that is different to where they were received, the Target Date for reporting has been extended.

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH46_3.5-3.6 23-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level, TPH Oil Industry Profile + PAHscreen
2	BH46_8.5-8.7 23-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level
3	BH46_12.0-12.1 23-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level
4	BH25_0.2-0.3 26-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level, TPH Oil Industry Profile + PAHscreen
5	BH25_1.5-1.6 26-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 4
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry), gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1, 4
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, 4
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, 4
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1, 4

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	4
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1, 4
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, 4
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, 4
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, 4



Hill Laboratories

TRIED, TESTED AND TRUSTED

Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.

BH46-01 GW samples - can these please be put on a separate COC + with same quote # and client reference please!

ANALYSIS REQUEST

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

Job No: Date Recv: 28-Aug-24 13:01

365 8976

Received by: Olivia Tod



3136589767

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 27.08.2024

Name: T. Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp

18.5

☐ Sample and Analysis details checked

Signature:

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	BH46_3.5-3.6	23.08.24	—	Soil	HM(7), TPH, PAH, Asb
2	BH46_8.5-8.7	23.08.24	—	Soil	HM(7)
3	BH46_12.0-12.1	23.08.24	—	Soil	HM(7)
4	BH46-01	28.08.24	—	Water	SVOCs, TSS, Dis HM, PAH, TPH
5	BH25_0.2-0.3	26.08.24	—	Soil	HM(7), TPH, PAH, Asb
6	BH25_1.5-1.6	26.08.24	—	Soil	HM(7)
7					
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10					
11					
12					

Continued on next page

Could this water sample please be on a separate COC but same quote # and ref #

Job Information Summary

Page 1 of 1

Client:	Aurecon New Zealand Limited	Lab No:	3658976
Contact:	Aaron Graham	Date Registered:	29-Aug-2024 10:10 am
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 2292	Quote No:	126272
	Tauranga 3140	Order No:	
		Client Reference:	521290-064
		Add. Client Ref:	
		Submitted By:	Aaron Graham
		Charge To:	Aurecon New Zealand Limited
		Target Date:	30-Aug-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH46_01 28-Aug-2024	Ground Water	Org500, TPH250, TOC125, UPte100	Hold Cold



Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdatt files please. Please advise before disposal.

ANALYSIS REQUEST

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

Job No: Date Recv: 03-Sep-24 17:42

366 3691

Received by: Sanaya Hansotia



3136636919

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 30.09.24

Name: T. Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp:

13.5

☐ Sample and Analysis details checked

Signature:

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	BH06-04-0.5	29.08.24		Soil	HM(7), ASB, TPH, PAH
2	BH06-14-1.5	29.08.24		Soil	HM(7)
3					
4					
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7					
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9					
10					
11					
12					

Continued on next page

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3663691
Contact:	Tiana Hill	Date Registered:	04-Sept-2024 12:34 pm
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	Sampled: 29/08/24
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date:	06-Sept-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH06_0.4-0.5	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil

Summary of Methods

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

Sample Type: Soil

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Weight of Asbestos as Asbestos Fines (Friable)	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1
Asbestos as Asbestos Fines as % of Total Sample	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1

Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.

ANALYSIS REQUEST

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

Job No: Date Recv: 04-Sep-24 09:30

366 4138

Received by: Olivia Tod

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


3136641388

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 3.09.24

Name: T. Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp:

13.5

☐ Sample and Analysis details checked

Signature:

 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	BH06-04-05	29.08.24		Soil	HM(7), ASB, TPH, PAH
2	BH06-14-15	29.08.24		Soil	HM(7)
3					
4					
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8					
9					
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11					
12					

Continued on next page

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3664138
Contact:	Tiana Hill	Date Registered:	05-Sept-2024 9:03 am
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date*:	09-Sept-2024 4:30 pm

* As the samples require analysis at a Hill Labs location that is different to where they were received, the Target Date for reporting has been extended.

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH06_0.4-0.5 29-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level, TPH Oil Industry Profile + PAHscreen
2	BH06_1.4-1.5 29-Aug-2024	Soil	GSoil300	Heavy Metals, Screen Level

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1
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
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
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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
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
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



Hill Laboratories

TRIED, TESTED AND TRUSTED

Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.

ANALYSIS REQUEST

367 0623

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

Received by: Olivia Tod



3136706235

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories Date & Time: 12.09.24 1:00pm

Name: Tiana Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

Temp:

☐ Room Temp ☐ Chilled ☐ Frozen

☐ Sample and Analysis details checked

Signature:

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	BH36 - 0.6 - 0.7	12.09.24		Soil	HM (7), Asb (sq), TPH, PAH
2	BH36 - 2.5 - 2.6	12.09.24		Soil	HM (7)
3	BH06 - 12.0 - 12.1	12.09.24		"	HM (7)
4	BH25 - 16.5 - 16.6	12.09.24		"	HM (7)
5	BH46 - 3.5 - 3.6	23.08.24		"	Asb (sq)
6	BH17 - 1.5 - 1.95	5.09.24		"	HM (7)
7	BH17 - 7.5 - 7.95	5.09.24		"	HM (7)
8	BH17 - 13.5 - 13.64	6.09.24		"	HM (7)
9					
10					
11					
12					

Continued on next page

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3670623
Contact:	Tiana Hill	Date Registered:	12-Sept-2024 1:25 pm
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date:	16-Sept-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH36_0.6-0.7 12-Sept-2024	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil
2	BH46_3.5-3.6 23-Aug-2024	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil

Summary of Methods

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

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Asbestos as Fibrous Asbestos as % of Total Sample	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2
Weight of Asbestos as Asbestos Fines (Friable)	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
Asbestos as Asbestos Fines as % of Total Sample	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2



Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By

Client Name Aurecon New Zealand Limited 32359

Address Te Tihi Level 3 / 110 Carlton Gore Road

Newmarket, Auckland Postcode 1023

Phone Mobile 021 0883 4125

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-064

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 andrew.allcock@aurecongroup.com

☐ Other

ADDITIONAL INFORMATION

Esdat files please. Please advise before disposal.

ANALYSIS REQUEST

367 0643

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

Received by: Olivia Tod



3136706437

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

CHAIN OF CUSTODY RECORD

Sent to Hill Laboratories

Date & Time: 12-09-24 1:00pm

Name: Tiana Hill

☒ Tick if you require COC to be emailed back

Signature: [Signature]

Received at Hill Laboratories

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp:

☐ Sample and Analysis details checked

Signature:

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	BH36 - 0.6 - 0.7	12.09.24		Soil	HM (7), Asb (sq), TPH, PAH
2	BH36 - 2.5 - 2.6	12.09.24		Soil	HM (7)
3	BH06 - 12.0 - 12.1	12.09.24		"	HM (7)
4	BH25 - 16.5 - 16.6	12.09.24		"	HM (7)
5	BH46 - 3.5 - 3.6	23.08.24		"	Asb (sq)
6	BH17 - 1.5 - 1.95	5.09.24		"	HM (7)
7	BH17 - 7.5 - 7.95	5.09.24		"	HM (7)
8	BH17 - 13.5 - 13.64	6.09.24		"	HM (7)
9					
10					
11					
12					

Continued on next page

Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3670643
Contact:	Tiana Hill	Date Registered:	13-Sept-2024 9:47 am
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-064
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date*:	17-Sept-2024 4:30 pm

* As the samples require analysis at a Hill Labs location that is different to where they were received, the Target Date for reporting has been extended.

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH36_0.6-0.7 12-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level, TPH Oil Industry Profile + PAHscreen
2	BH36_2.5-2.6 12-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level
3	BH06_12.0-12.1 12-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level
4	BH25_16.5-16.6 12-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level
5	BH17_1.5-1.95 05-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level
6	BH17_7.5-7.95 05-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level
7	BH17_13.5-13.64 06-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry), gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1
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
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
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1
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
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
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



Quote No 126272

Primary Contact Tiana Hill 298786

Submitted By Tiana Hill 298786

Client Name Aurecon New Zealand Limited 32359

Address PO Box 2292, Tauranga 3140

Phone 07 578 6183 Mobile

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-64

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 Andrew, allcock @ aurecongroup.com
☐ Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

ANALYSIS REQUEST

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

Job No: Date Recv: 18-Sep-24 15:43

367 4826

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

Received by: Olivia Tod



3136748260

CHAIN OF CUSTODY RECORD

Sent to
Hill Labs

Date & Time: 18/09/24

☒ Tick if you require COC
to be emailed back

Name: Hannah

Signature: H. Suber

Received at
Hill Labs

Date & Time:

Name:

Signature:

Condition

Temp:

☐ Room Temp ☐ Chilled ☐ Frozen

11.1

☐ Sample & Analysis details checked

Signature:

Priority ☐ Low ☐ Normal ☒ High

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

NOTE: The estimated turnaround time for the types and number of samples
and analyses specified on this quote is by 4:30 pm, 7 working days following the
day of receipt of the samples at the laboratory.

Requested Reporting Date:

Quoted Sample Types

Soil (Soil), Ground Water (GW)

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1	BH38 - 1.1 - 1.2	18.09.24	Soil	HMs Soil, Asb Soil PA-ET, TPH oil BxP, SVOC SC
2	BH14 - 0.6 - 0.7	16.09.24	↓	HMs Soil, Asb Soil PA-ET, TPBX P
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Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3674826
Contact:	Tiana Hill	Date Registered:	18-Sept-2024 3:55 pm
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-64
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date:	20-Sept-2024 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH38_1.1-1.2 18-Sept-2024	Soil	cPSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil
2	BH14_0.6-0.7 16-Sept-2024	Soil	PSoil500Asb	New Zealand Guidelines Semi Quantitative Asbestos in Soil

Summary of Methods

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

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Asbestos as Fibrous Asbestos as % of Total Sample	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2
Weight of Asbestos as Asbestos Fines (Friable)	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2
Asbestos as Asbestos Fines as % of Total Sample	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2



Quote No 126272

Primary Contact Tiana.Hill 298786

Submitted By Tiana Hill 298786

Client Name Aurecon New Zealand Limited 32359

Address PO Box 2292, Tauranga 3140

Phone 07 578 6183 Mobile

Email nzenvlabs@aurecongroup.com

Charge To Aurecon New Zealand Limited 32359

Client Reference 521290-64

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 andrew.allcock@aurecongroup.co.nz
☐ Other

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

ADDITIONAL INFORMATION / KNOWN HAZARDS

Quoted Sample Types

Soil (Soil), Ground Water (GW)

ANALYSIS REQUEST

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

Job No: Date Recv: 18-Sep-24 15:48

367 4838

Received by: Olivia Tod



3136748385

CHAIN OF CUSTODY RECORD

Sent to
Hill Labs

Date & Time: 18/09/24

☒ Tick if you require COC
to be emailed back

Name: Hannah

Signature: H. G. G. G.

Received at
Hill Labs

Date & Time:

Name:

Signature:

Condition

☐ Room Temp ☐ Chilled ☐ Frozen

Temp:

11.1

☐ Sample & Analysis details checked

Signature:

Priority ☐ Low ☐ Normal ☒ High

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

NOTE: The estimated turnaround time for the types and number of samples
and analyses specified on this quote is by 4:30 pm, 7 working days following the
day of receipt of the samples at the laboratory.

Requested Reporting Date:

No. Sample Name Sample Date/Time Sample Type Tests Required

1	BH38-1.1-1.2	18.09.24	Soil	HM's Soil, Asb Soil PA-ET, TPH oil BxP, SVOC SC
2	BH14-0.6-0.7	16.09.24	↓	HM's Soil, Asb Soil PA-ET, TPBX P
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Job Information Summary

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3674838
Contact:	Tiana Hill	Date Registered:	19-Sept-2024 9:39 am
	C/- Aurecon New Zealand Limited	Priority:	High
	PO Box 9762	Quote No:	126272
	Newmarket	Order No:	
	Auckland 1149	Client Reference:	521290-64
		Add. Client Ref:	
		Submitted By:	Tiana Hill
		Charge To:	Aurecon New Zealand Limited
		Target Date*:	23-Sept-2024 4:30 pm

* As the samples require analysis at a Hill Labs location that is different to where they were received, the Target Date for reporting has been extended.

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	BH38_1.1-1.2 18-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level, Semivolatile Organic Compounds Screening in Soil by GC-MS, TPH + BTEX profile, Soil
2	BH14_0.6-0.7 16-Sept-2024	Soil	GSoil300	Heavy Metals, Screen Level, TPH + PAH + BTEX profile

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	2
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-2
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	2
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	2
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2
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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Polycyclic Aromatic Hydrocarbons Screening in Soil	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	2
Semivolatile Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.024 - 30 mg/kg dry wt	1
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2
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
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
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

Attachment G – Sample Registers

Table G2: Groundwater sample register

Shaft	Borehole	Sample ID	Heavy metals	TSS	TPH	PAH	SVOCs
SH02	BH06	BH06_01	x	x	-	x	-
SH03	BH10	BH10_01	x	x	-	-	-
SH04	BH14	BH14-01	x	x	x	x	-
SH05	BH17	BH17_01	x	x	-	-	-
SH07	BH25	BH25_01	x	x	-	x	-
SH09	BH36	BH36_01	x	x	x	x	-
SH10	BH38	BH38_01	x	x	x	x	-
SH11	BH39	BH39-01	x	x	x	x	x
SH12A	BH44	BH44_01	x	x	x	x	x
SH12	BH46	BH46_02	x	x	x	x	x
SH15	BH51	BH51_01	x	x	-	-	-

Note:
x Test requested
- Not requested

Table G1: Soil sample register

Shaft	Borehole	Sample ID	Heavy Metals	TPH	PAH	BTEX	SVOC	OCP	ASB	Hold Cold
SH02	BH06	BH06_0.1-0.2	-	-	-	-	-	-	-	X
SH02	BH06	BH06_0.4-0.5	X	X	X	-	-	-	X	-
SH02	BH06	BH06_1.0-1.1	-	-	-	-	-	-	-	X
SH02	BH06	BH06_1.4-1.5	X	-	-	-	-	-	-	-
SH02	BH06	BH06_12.0-12.1	X	-	-	-	-	-	-	-
SH02	BH06	BH06_2.5	-	-	-	-	-	-	-	X
SH02	BH06	BH06_7.95	-	-	-	-	-	-	-	X
SH03	BH10	BH10_0.05-0.2	-	-	-	-	-	-	-	X
SH03	BH10	BH10_0.4-0.5	X	X	X	X	-	-	X	-
SH03	BH10	BH10_1.0-1.1	X	X	X	X	-	-	X	-
SH03	BH10	BH10_1.4-1.5	-	-	-	-	-	-	-	X
SH03	BH10	BH10_1.8-1.9	X	-	-	-	-	-	-	-
SH03	BH10	BH10_3.3-3.4	X	-	-	-	-	-	-	-
SH03	BH10	BH10_5.9-6.0	X	-	-	-	-	-	-	-
SH03	BH10	BH10_9.4-9.5	X	-	-	-	-	-	-	-
SH04	BH14	BH14_0.6-0.7	X	X	X	X	-	-	X	-
SH04	BH14	BH14_1.0-1.1	-	-	-	-	-	-	-	X
SH04	BH14	BH14_2.5-2.6	X	-	-	-	-	-	-	-
SH04	BH14	BH14_10.0-10.1	X	-	-	-	-	-	-	-
-	BH13	BH13_0.05-0.2	-	-	-	-	-	-	-	X
-	BH13	BH13_0.4-0.5	X	X	X	-	-	-	X	-
-	BH13	BH13_1.0-1.1	-	-	-	-	-	-	-	X
-	BH13	BH13_1.4-1.5	X	X	X	-	-	-	-	-
-	BH13	BH13_1.9-2.0	-	-	-	-	-	-	-	X
-	BH13	BH13_2.4-2.5	-	-	-	-	-	-	-	X
-	BH13	BH13_2.9-3.0	-	-	-	-	-	-	-	X
SH05	BH17	BH17_0.05	-	-	-	-	-	-	-	X
SH05	BH17	BH17_0.07	-	-	-	-	-	-	-	X
SH05	BH17	BH17_1.5-1.95	X	-	-	-	-	-	-	-
SH05	BH17	BH17_10.5-10.95	-	-	-	-	-	-	-	X
SH05	BH17	BH17_12.0-12.22	-	-	-	-	-	-	-	X
SH05	BH17	BH17_13.5-13.64	X	-	-	-	-	-	-	-
SH05	BH17	BH17_3.5-3.95	-	-	-	-	-	-	-	X
SH05	BH17	BH17_5.0-5.45	-	-	-	-	-	-	-	X
SH05	BH17	BH17_6.5-6.95	-	-	-	-	-	-	-	X
SH05	BH17	BH17_7.5-7.95	X	-	-	-	-	-	-	-
SH05	BH17	BH17_9.0-9.33	-	-	-	-	-	-	-	X
SH06	BH21	BH21_11.0-11.1	X	-	-	-	-	-	-	-
SH06	BH21	BH21_16.4-16.5	X	-	-	-	-	-	-	-
SH06	BH21	BH21_5.4-5.5	X	-	-	-	-	-	-	-
SH06	BH21	BH21_6.6-6.7	-	-	-	-	-	-	-	X
-	BH22	BH22_0.2-0.3	X	-	-	-	-	-	-	-
-	BH22	BH22_0.6	X	-	-	-	-	-	-	-
SH07	BH24	BH24_0.05-0.2	-	-	-	-	-	-	-	X
SH07	BH24	BH24_0.3-0.4	-	-	-	-	-	-	-	X
SH07	BH24	BH24_0.5-0.6	-	-	-	-	-	-	-	X
SH07	BH24	BH24_1.0-1.1	-	-	-	-	-	-	-	X
SH07	BH25	BH25_0.05-0.15	-	-	-	-	-	-	-	X
SH07	BH25	BH25_0.2-0.3	X	X	X	-	-	-	X	-
SH07	BH25	BH25_1.0-1.2	-	-	-	-	-	-	-	X
SH07	BH25	BH25_1.5-1.6	X	-	-	-	-	-	-	-
SH07	BH25	BH25_16.5-16.6	X	-	-	-	-	-	-	-
-	BH29	BH29_0.05-0.2	X	-	-	-	-	-	X	-
-	BH30	BH30_0.23	X	-	X	-	-	X	X	-
-	BH30	BH30_0.62	X	-	X	-	-	-	X	-
SH09	BH35	BH35_3.4-3.5	X	X	X	-	-	-	-	-
SH09	BH35	BH35_4.0-4.1	X	-	-	-	-	-	-	-
SH09	BH35	BH35_5.3-5.4	-	-	-	-	-	-	-	X
SH09	BH35	BH35_7.4-7.5	-	-	-	-	-	-	-	X
SH09	BH36	BH36_0.6-0.7	X	X	X	-	-	-	X	-
SH09	BH36	BH36_1.3-1.5	-	-	-	-	-	-	-	X
SH09	BH36	BH36_2.5-2.6	X	-	-	-	-	-	-	-
SH09	BH36	BH36_5.45	X	-	-	-	-	-	-	-
SH10	BH38	BH38_0.5-0.6	-	-	-	-	-	-	-	X
SH10	BH38	BH38_1.1-1.2	X	X	-	X	X	-	X	-
SH10	BH38	BH38_1.5-1.6	-	-	-	-	-	-	-	X
SH10	BH38	BH38_6.7-7.0	X	-	-	-	-	-	-	-
SH11	BH39	BH39_0.2-0.3	-	-	-	-	-	-	-	X
SH11	BH39	BH39_0.5-0.6	X	X	X	X	-	-	X	-
SH11	BH39	BH39_1.0-1.1	-	-	-	-	-	-	-	X
SH11	BH39	BH39_1.5-1.6	X	-	-	-	-	-	-	-
SH11	BH39	BH39_1.9-2.0	-	-	-	-	-	-	-	X
SH11	BH39	BH39_10.5-10.95	-	-	-	-	-	-	-	X
SH11	BH39	BH39_12.0-12.45	X	-	-	-	-	-	-	-
SH11	BH39	BH39_3.0-3.45	X	-	-	-	-	-	-	-
SH11	BH39	BH39_4.5-4.95	-	-	-	-	-	-	-	X
SH11	BH39	BH39_6.0-6.45	X	-	-	-	-	-	-	-
SH11	BH39	BH39_7.5-7.95	-	-	-	-	-	-	-	X
SH11	BH39	BH39_9.0-9.45	X	-	-	-	-	-	-	-
SH12A	BH43	BH43_0.5-0.6	X	X	X	-	-	-	X	-
SH12A	BH43	BH43_1.0-1.1	-	-	-	-	-	-	-	X
SH12A	BH43	BH43_2.3	X	-	-	-	-	-	-	-
SH12A	BH44	BH44_0.05-0.2	-	-	-	-	-	-	-	X

Note:
x Test requested
- Not requested

Shaft	Borehole	Sample ID	Heavy Metals	TPH	PAH	BTEX	SVOC	OCP	ASB	Hold Cold
SH12A	BH44	BH44_0.3-0.4	x	x	x	-	-	-	x	-
SH12A	BH44	BH44_0.5-0.6	-	-	-	-	-	-	-	x
SH12A	BH44	BH44_0.8-0.9	-	-	-	-	-	-	-	x
SH12A	BH44	BH44_1.1-1.2	x	x	x	-	-	-	x	-
SH12A	BH44	BH44_1.4-1.5	-	-	-	-	-	-	-	x
SH12A	BH44	BH44_10.5-10.6	x	-	-	-	-	-	-	-
SH12A	BH44	BH44_2.0-2.4	-	-	-	-	-	-	-	x
SH12A	BH44	BH44_3.0-3.4	x	x	x	-	-	-	x	-
SH12A	BH44	BH44_6.0-6.3	x	-	-	-	-	-	-	-
SH12	BH45	BH45_0.05-0.2	-	-	-	-	-	-	-	x
SH12	BH45	BH45_0.3-0.4	-	-	-	-	-	-	-	x
SH12	BH45	BH45_0.8-1.0	x	x	x	-	-	-	x	-
SH12	BH45	BH45_1.4-1.6	-	-	-	-	-	-	-	x
SH12	BH45	BH45_4.3-4.5	-	-	-	-	-	-	-	x
SH12	BH45	BH45_6.2-6.45	-	-	-	-	-	-	-	x
SH12	BH46	BH46_0.05-0.2	-	-	-	-	-	-	-	x
SH12	BH46	BH46_0.4-0.5	x	x	x	-	-	-	x	-
SH12	BH46	BH46_1.0-1.1	-	-	-	-	-	-	-	x
SH12	BH46	BH46_1.4-1.6	x	x	x	-	-	-	x	-
SH12	BH46	BH46_10.5-10.6	-	-	-	-	-	-	-	x
SH12	BH46	BH46_12.0-12.1	x	-	-	-	-	-	-	-
SH12	BH46	BH46_3.5-3.6	x	x	x	-	-	-	x	-
SH12	BH46	BH46_7.5-7.8	-	-	-	-	-	-	-	x
SH12	BH46	BH46_8.5-8.7	x	-	-	-	-	-	-	-
SH12	BH46	BH46_9.0-9.3	-	-	-	-	-	-	-	x
SH13	BH48	BH48_0.05-0.2	x	-	-	-	-	-	x	-
SH13	BH48	BH48_3.0-3.1	x	-	-	-	-	-	-	-
SH13	BH48	BH48_6.5-6.7	x	-	-	-	-	-	-	-
SH14	BH49	BH49_0.05-0.2	x	x	x	x	-	-	x	-
SH14	BH49	BH49_0.3-0.4	x	x	x	x	-	-	x	-
SH14	BH49	BH49_0.5-0.6	-	-	-	-	-	-	-	x
SH14	BH49	BH49_1.0-1.1	-	-	-	-	-	-	-	x
SH14	BH49	BH49_1.4-1.5	-	-	-	-	-	-	-	x
SH14	BH49	BH49_2.7-2.8	x	-	-	-	-	-	-	-
SH14	BH49	BH49_5.0-5.1	x	-	-	-	-	-	-	-
SH14	BH49	BH49_5.9-6.0	x	-	-	-	-	-	-	-
SH14	BH49	BH49_8.0-8.1	-	-	-	-	-	-	-	x
SH14	BH49	BH49_B1	-	-	-	-	-	-	x	-
SH15	BH51	BH51_0.05-0.2	-	-	-	-	-	-	-	x
SH15	BH51	BH51_0.5-0.6	x	x	x	-	-	-	x	-
SH15	BH51	BH51_12-12.33	x	-	-	-	-	-	-	-
SH15	BH51	BH51_2.0-2.45	x	x	-	-	-	-	-	-
SH15	BH51	BH51_3.0-3.2	-	-	-	-	-	-	-	x
SH15	BH51	BH51_3.5-3.95	-	-	-	-	-	-	-	x
SH15	BH51	BH51_5.0-5.45	x	-	-	-	-	-	-	-
SH15	BH51	BH51_6.5-6.95	-	-	-	-	-	-	-	x
SH15	BH51	BH51_8.0-8.45	x	-	-	-	-	-	-	-
SH15	BH51	BH51_9.0-9.45	-	-	-	-	-	-	-	x

Attachment H– Laboratory Results and Screened results tables

[illegible]

#1 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
 #2 Value for hexavalent chromium
 #3 No limit. Derived value exceeds 10,000 mg/kg.
 #4 Value is for inorganic lead
 #5 Value is for BaP TEQ. Refer NES Users' Guide for notes.
 #6 The SCs value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dieldrin if both are involved.
 #7 DDT (as the sum of DDT and its metabolites DDD and DDE)
 #8 Value is for total chromium
 #9 Value is for benz(a) pyrene (equivalent)
 #10 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
 #11 Work suggests special cases may have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be considered individually.
 #12 Value for total styrene (m and p)
 #13 Residual Separate Phase Hydrocarbons (RSPH)

Environmental Standards

- A - Ministry for the Environment, 2012, NESCS - Commercial / Industrial
- B - NEPC, 2013, NEPM (N Zn only) - Commercial / Industrial
- C - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria.
- D - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils
- E - wasteMINZ, September 2013, Class 3 Managed Fill Waste Acceptance Criteria
- F - Ministry for the Environment, August 1999, Module 4, Tier 1 Maintenance worker (SAND)
- G - Ministry for the Environment, August 1999, Module 4, Tier 1 GW 2m (CLAY)/(SANDY SILT)
- H - BRANZ, 2017, NZ GAMS (Asbestos) Commercial / Industrial

Lab Report No.	Field ID + Depth (m)	Location	Characterising	Matrix Type	Matrix Description	BTEX					Organochlorine Pesticides																								SVOCs											
						Benzene	Toluene	Ethylbenzene	Xylenes (o)	Xylenes (m & p)	Aldrin	γ-HCH	β-HCH	δ-HCH	γ-HCH (Lindane)	Chlordane (cis)	Chlordane (trans)	DDD	o,p'-DDD	o,p'-DDE	4,4'-DDE	DDT	2,4'-DDT	Endosulfan I	Dieldrin	Endosulfan II	Endrin	Endosulfan sulphate	Endrin ketone	Endrin aldehyde	Heptachlor	Methoxychlor	Heptachlor epoxide	1,2-Chloronaphthalene	DIC-4-ethylhexylphosphate	N-Minoscopolophenylamine + Diphenylamine	Carbazole	Naphthalene	4-bromophenyl phenyl ether	4-chlorophenyl phenyl ether	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl) ether	Bis(2-chloroisopropyl) ether	Dibenzodioxin	
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
NESCS and NEPM (for Ni, Zn only) - Commercial						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Auckland Unitary Plan - Chapter E30 - Permitted Activity						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Class 3 Managed Fill Waste						0.11	19	10	25 ^{#12}	25 ^{#12}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Module 4, Tier 1 Maintenance						3	94	670	150 ^{#12}	150 ^{#12}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Module 4, Tier 1 GW 2m (SANDY)						0.0054	1	1.1	0.61 ^{#12}	0.61 ^{#12}	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Module 4, Tier 1 GW 2m (SANDY)						0.029	6	7.2	3.7	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
NZ GAMAS (Asbestos) Commercial						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

#1 Default value is for pH of 5. Concentrations increase with increasing pH (see methodology).
#2 Value for hexavalent chromium
#3 No limit. Derived value exceeds 10,000 mg/kg.
#4 Value is for inorganic lead
#5 Value is for BaP TEQ. Refer NES Users' Guide for notes.
#6 The SVOC value is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dieldrin if both are involved.
#7 DDT (as the sum of DDT and its metabolites DDD and DDE)
#8 Value is for total chromium
#9 Value is for benzo (a) pyrene (equivalent)
#10 Value for total chromium. Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these fill
#11 Work suggests special cases have been found to apply for Ti Point Basalts (Cr), Mt Smart Volcanics (Pb) and as such these lithologies need to be consi
#12 Value for total xylene (o, m and p)
#13 Residual Separate Phase Hydrocarbons (RSPH)

Environmental Standards
A - Ministry for the Environment, 2012, NESCS - Commercial / Industrial
B - NEPC, 2013, NEPM (Ni, Zn only) - Commercial Industrial
C - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Permitted Activity Criteria
D - Auckland Council, 2016, Auckland Unitary Plan - Chapter E30 - Background - Volcanic Soils
E - wasteMINZ, September 2023, Class 3 Managed Fill Waste Acceptance Criteria
F - Ministry for the Environment, August 1999, Module 4, Tier 1 Maintenance worker (SAND)
G - Ministry for the Environment, August 1999, Module 4, Tier 1 GW 2m (CLAY)(SANDY SILT)
H - BRANDZ, 2017, NZ GAMAS (Asbestos) Commercial/Industrial



	Inorgani cs	TPH				PAH															Phenols									
	TSS	C7-C9	C15-C36	C7-C36	C10-C14	2-methylnaphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Benzo(b,f)fluoranthene	Phenanthrene	Pyrene	3/4-Methylphenol (m/p-cresol)	2,4,5-Trichlorophenol	2,4,6-Trichlorophenol	2,4-Dichlorophenol	2,4-Dimethylphenol	2-Chlorophenol	2-Methylphenol	2-Nitrophenol
	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable ^A		18 ^{#1}	#2		#2																									
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation ^A		#2	#2		#2														800			2,000								
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023) ^B								7 ^{#3}		0.7 ^{#3}						2 ^{#3}			85 ^{#4}		8 ^{#3}				95 ^{#4}	270 ^{#5}		870 ^{#6}		

Lab Report No.	Field ID	Location	Characterising	Date	Matrix Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Statistics																															
Minimum Concentration	<3	<0.1	<0.4	<0.7	<200	<3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.5	<0.1	<0.4	<0.2	<10	<10	<10	<10	<5	<5	<5	<5	<10
Maximum Concentration	36,000	0.62	<0.4	1.8	1,100	23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.5	<0.1	<0.4	<0.2	<10	<10	<10	<10	<5	<5	<5	<5	<10
% of Detects	86	14	0	14	14	20	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects	14	86	100	86	86	80	100	100	100	100	100	100	100	100	100	100	100	100	85	100	100	100	100	100	100	100	100	100	100	100	100

Comments

#1 ESL

#2 >S

#3 Unknown reliability

#4 Low reliability

#5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.

#6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.

#7 Moderate reliability

#8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic values or geometric mean for species). Check toxicant DGV technical brief for spread of data and its significance.

#9 High reliability

#10 Very Low reliability

#11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV technical brief for spread of data and its significance. This DGV is greater than the value for acute toxicity (Warne et al., 2018).

Environmental Standards

A: MfE, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.

B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)



				Amino Aliphatics	Chlorinated Hydrocarbons	Metals							Explosives			Halogenated Benzenes				Organochlorine Pesticides											
	4-chloro-3-methylphenol	Pentachlorophenol	Phenol	N-nitrosodi-n-propylamine	Hexachloroethane	Hexachlorobutadiene	Arsenic (filtered)	Cadmium (filtered)	Copper (filtered)	Chromium (III+VI) (filtered)	Lead (filtered)	Nickel (filtered)	Zinc (filtered)	2,6-dinitrotoluene	2,4-Dinitrotoluene	Nitrobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	4,4-DDE	a-BHC	Aldrin	b-BHC	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable ^A																															
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation ^A																															
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023) ^B		27 ^{#7}	1,200 ^{#7}		500 ^{#7}			0.8 ^{#8}	2.5 ^{#8}		9.4 ^{#6}	17 ^{#4}	31 ^{#9}		250 ^{#6}	1,300 ^{#4}	300 ^{#5}	270 ^{#7}	520 ^{#6}	100 ^{#10}	0.3 ^{#3}								0.04 ^{#7}		

Lab Report No.	Field ID	Location	Characterising	Date	Matrix Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Statistics																																		
Minimum Concentration	<10	<100	<10	<10	<10	<10	<1	<0.05	0.5	<0.5	<0.1	<0.5	<1	<10	<10	<5	<5	<10	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
Maximum Concentration	<10	<100	<10	<10	<10	<10	1.9	0.17	2.6	0.6	0.17	34	62	<10	<10	<5	<5	<10	<10	<10	<5	<5	<10	<10	<10	<5	<5	<5	<5	<5	<5	<10	<5	<10
% of Detects	0	0	0	0	0	0	7	7	73	7	7	80	87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects	100	100	100	100	100	100	93	93	27	93	93	20	13	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Comments

#1 ESL

#2 >S

#3 Unknown reliability

#4 Low reliability

#5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic value)

#6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic)

#7 Moderate reliability

#8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic)

#9 High reliability

#10 Very Low reliability

#11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV

Environmental Standards

A: MfE, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.

B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)

								Phthalates							SVOCs											
	Endosulfan II	Endosulfan sulphate	Endrin	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Bis(2-ethylhexyl) phthalate	Butyl benzyl phthalate	Dimethyl phthalate	Di-n-octyl phthalate	Diethylphthalate	Di-n-butyl phthalate	1&2-Chloronaphthalene	Di(2-ethylhexyl)adipate	N-Nitrosodiphenylamine + Diphenylamine	Carbazole	Isophorone	4-bromophenyl phenyl ether	4-chlorophenyl phenyl ether	Benzyl alcohol	Bis(2-chloroethoxy) methane	Bis(2-chloroethyl)ether	Bis(2-chloroisopropyl) ether	Dibenzofuran	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	g/m3	µg/L	g/m3	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Module 5, Tier 1 Groundwater Acceptance Criteria, Potable ^A																										
Module 5, Tier 1 Groundwater Acceptance Criteria, Irrigation ^A																										
ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023) ^B			0.06 ^{#11}		1 ^{#11}	0.7 ^{#11}				5,100 ^{#4}		1,300 ^{#4}	65 ^{#4}													

Lab Report No.	Field ID	Location	Characterising	Date	Matrix Type																										
3680726	BH06_01	Suffolk Reserve	Shaft SH02	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH10_01	Mostyn Street	Shaft SH03	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3680726	BH44_01	Basque Park	Shaft SH12A	26 09 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<50	<5	<5	<5	<5
3680726	BH46_02	Basque Park	Shaft SH12	26 09 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5
3680726	BH51_01	Arch Hill Reserve	Shaft SH15	26 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH17_01	52 Kingsland Ave	Shaft SH05	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH25_01	Myrtle Street	Shaft SH07	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH36_01	Ophir Street	Shaft SH09	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3683704	BH38_01	Gundry Street	Shaft SH10	30 09 2024	Groundwater	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3690956	BH14-01	Nixon Park Carpark	Shaft SH04	10 10 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<50	<5	<5	<5	<5
3690956	BH39-01	Burgoyne Street	Shaft SH11	10 10 2024	Groundwater	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<10	<0.003	<5	<0.010	<5	<5	<5	<5	<50	<5	<5	<5	<5

Statistics																												
Minimum Concentration	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<0.003	<5	<0.01	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
Maximum Concentration	<10	<10	<10	<10	<5	<5	<5	<30	<10	<10	<10	<10	<10	<0.003	<5	<0.01	<5	<5	<5	<5	<50	<5	<5	<5	<5	<5	<5	<5
% of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% of Non-Detects	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Comments

- #1 ESL
- #2 >S
- #3 Unknown reliability
- #4 Low reliability
- #5 Low reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic value
- #6 Moderate reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
- #7 Moderate reliability
- #8 Very high reliability. DGV may not protect key test species from chronic toxicity (this refers to experimental chronic
- #9 High reliability
- #10 Very Low reliability
- #11 Moderate reliability. DGV may not protect key test species from acute (and chronic) toxicity. Check toxicant DGV

Environmental Standards

A: MfE, 1999. MfE Petroleum Guidelines. Module 5: Teir 1 groundwater acceptance criteria.
B: ANZG, July 2023, ANZG Freshwater Toxicant DGVs LOSP 80% (July 2023)



							Metals TCLP						
							Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Nickel	Zinc
							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Class 1 Landfill Waste Acceptance Criteria							5	1	5	5	10	10	
Class 2 C + D Landfill Waste Acceptance Criteria							1	0.2	1	0.5	1	1	1
Lab Report No.	Field ID + Depth (m)	Location	Characterising	Matrix Type	Matrix Description	Sample date	-	-	-	-	0.55	-	-
3620390	BH48 0.05-0.2 (TCLP Extract)	Copper Street	Shaft SH13	Soil	SILT (Fill)	06 07 2024							
Statistics													
Minimum Concentration							4	<0.1	12	10	0.55	<2	10
Maximum Concentration							70	0.44	43	52	0.55	80	310
% of Detects							100	67	100	100	100	83	100
% of Non-Detects							0	33	0	0	0	17	0

Environmental Standards
wasteMINZ, September 2023, Class 1 and 2 Waste Acceptance Criteria

Certificate of Analysis

Page 1 of 1

Client:	Aurecon New Zealand Limited	Lab No:	3610977	SPv1
Contact:	Tiana Hill	Date Received:	20-Jun-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	27-Jun-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Aqueous

Sample Name:	BH15_01 20-Jun-2024
Lab Number:	3610977.1
Individual Tests	
Dissolved Mercury g/m ³	< 0.00008
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	
Dissolved Arsenic g/m ³	0.0021
Dissolved Cadmium g/m ³	< 0.00005
Dissolved Chromium g/m ³	< 0.0005
Dissolved Copper g/m ³	0.0017
Dissolved Lead g/m ³	< 0.00010
Dissolved Nickel g/m ³	0.0016
Dissolved Zinc g/m ³	< 0.0010

Summary of Methods

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

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m ³	1
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1
Filtration for dissolved metals analysis - Misc	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1
Dissolved Mercury	0.45µm filtration, bromine oxidation followed by atomic fluorescence. US EPA Method 245.7, Feb 2005.	0.00008 g/m ³	1

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

Testing was completed between 24-Jun-2024 and 27-Jun-2024. For completion dates of individual analyses please contact the laboratory.

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

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



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

Certificate of Analysis

Page 1 of 4

Client:	Aurecon New Zealand Limited	Lab No:	3680726	SPv1
Contact:	Tiana Hill	Date Received:	26-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	04-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Aqueous

Sample Name:	BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:	3680726.1	3680726.2	3680726.3	3680726.4	3680726.5

Individual Tests

Total Suspended Solids	g/m ³	4,200	1,340	96	-	36,000
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Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn

Dissolved Arsenic	g/m ³	< 0.0010	< 0.0010	< 0.0010	0.0019	< 0.0010
Dissolved Cadmium	g/m ³	0.00017	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m ³	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m ³	0.0026	0.0026	0.0013	0.0010	0.0012
Dissolved Lead	g/m ³	0.00017	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m ³	0.034	0.0010	0.0054	0.0034	0.0027
Dissolved Zinc	g/m ³	0.062	0.0035	0.0049	0.0024	0.0117

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq

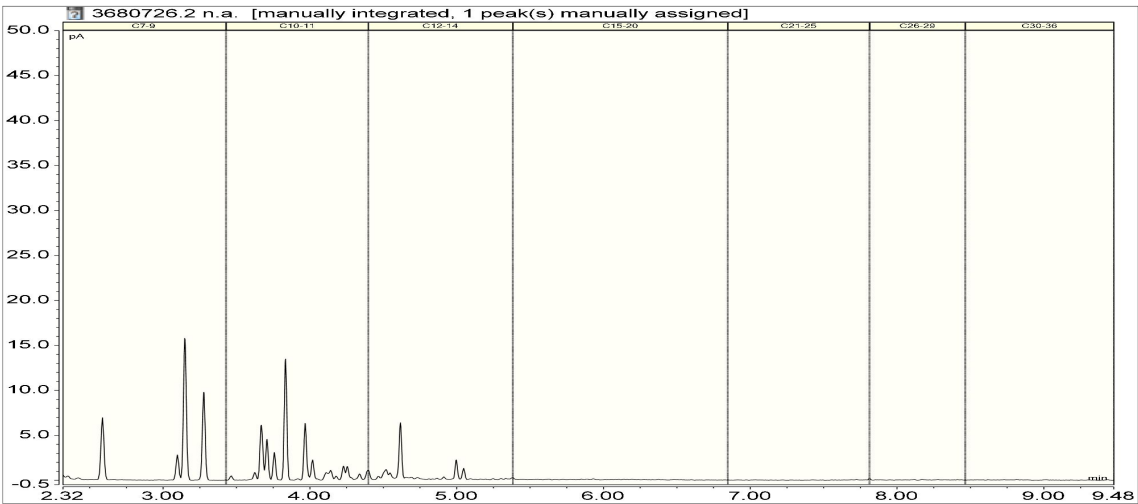
Acenaphthene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Acenaphthylene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Anthracene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Chrysene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Fluoranthene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Fluorene	g/m ³	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m ³	< 0.00010	< 0.00010	-	< 0.00010	< 0.00010
Naphthalene	g/m ³	< 0.0005	0.099	-	< 0.0005	< 0.0005
Phenanthrene	g/m ³	< 0.0004	< 0.0004	-	< 0.0004	< 0.0004
Pyrene	g/m ³	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002

Haloethers in SVOC Water Samples by GC-MS

Bis(2-chloroethoxy) methane	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Bis(2-chloroethyl)ether	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Bis(2-chloroisopropyl)ether	g/m ³	-	< 0.005	-	< 0.005	< 0.005
4-Bromophenyl phenyl ether	g/m ³	-	< 0.005	-	< 0.005	< 0.005
4-Chlorophenyl phenyl ether	g/m ³	-	< 0.005	-	< 0.005	< 0.005

Sample Type: Aqueous						
Sample Name:		BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:		3680726.1	3680726.2	3680726.3	3680726.4	3680726.5
Nitrogen containing compounds in SVOC Water Samples by GC-MS*						
2,4-Dinitrotoluene	g/m ³	-	< 0.010	-	< 0.010	< 0.010
2,6-Dinitrotoluene	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Nitrobenzene	g/m ³	-	< 0.005	-	< 0.005	< 0.005
N-Nitrosodi-n-propylamine	g/m ³	-	< 0.010	-	< 0.010	< 0.010
N-Nitrosodiphenylamine + Diphenylamine*	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Organochlorine Pesticides in SVOC Water Samples by GC-MS						
Aldrin	g/m ³	-	< 0.005	-	< 0.005	< 0.005
alpha-BHC	g/m ³	-	< 0.005	-	< 0.005	< 0.005
beta-BHC	g/m ³	-	< 0.005	-	< 0.005	< 0.005
delta-BHC	g/m ³	-	< 0.005	-	< 0.005	< 0.005
gamma-BHC (Lindane)	g/m ³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDD	g/m ³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDE	g/m ³	-	< 0.005	-	< 0.005	< 0.005
4,4'-DDT	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Dieldrin	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Endosulfan I	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Endosulfan II	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Endosulfan sulphate	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Endrin	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Endrin ketone	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Heptachlor	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Heptachlor epoxide	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Hexachlorobenzene	g/m ³	-	< 0.005	-	< 0.005	< 0.005
Polycyclic Aromatic Hydrocarbons in SVOC Water Samples by GC-MS						
Acenaphthene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Acenaphthylene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Anthracene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Benzo[a]anthracene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Benzo[a]pyrene (BAP)	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Benzo[g,h,i]perylene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Benzo[k]fluoranthene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
1&2-Chloronaphthalene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Chrysene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Dibenzo[a,h]anthracene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Fluoranthene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Fluorene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Indeno(1,2,3-c,d)pyrene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
2-Methylnaphthalene	g/m ³	-	0.023	-	< 0.003	< 0.003
Naphthalene	g/m ³	-	0.065	-	< 0.003	< 0.003
Phenanthrene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Pyrene	g/m ³	-	< 0.003	-	< 0.003	< 0.003
Phenols in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol	g/m ³	-	< 0.010	-	< 0.010	< 0.010
2-Chlorophenol	g/m ³	-	< 0.005	-	< 0.005	< 0.005
2,4-Dichlorophenol	g/m ³	-	< 0.005	-	< 0.005	< 0.005
2,4-Dimethylphenol	g/m ³	-	< 0.005	-	< 0.005	< 0.005
3 & 4-Methylphenol (m- + p-cresol)	g/m ³	-	< 0.010	-	< 0.010	< 0.010
2-Methylphenol (o-Cresol)	g/m ³	-	< 0.005	-	< 0.005	< 0.005
2-Nitrophenol	g/m ³	-	< 0.010	-	< 0.010	< 0.010
Pentachlorophenol (PCP)	g/m ³	-	< 0.10	-	< 0.10	< 0.10
Phenol	g/m ³	-	< 0.010	-	< 0.010	< 0.010

Sample Type: Aqueous						
Sample Name:		BH06_01 26-Sep-2024 12:40 pm	BH14_01 26-Sep-2024 11:50 am	BH51_01 26-Sep-2024 11:00 am	BH44_01 26-Sep-2024 2:50 pm	BH46_02 26-Sep-2024 2:25 pm
Lab Number:		3680726.1	3680726.2	3680726.3	3680726.4	3680726.5
Phenols in SVOC Water Samples by GC-MS						
2,4,5-Trichlorophenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
2,4,6-Trichlorophenol	g/m³	-	< 0.010	-	< 0.010	< 0.010
Plasticisers in SVOC Water Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	g/m³	-	< 0.03	-	< 0.03	< 0.03
Butylbenzylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di(2-ethylhexyl)adipate	g/m³	-	< 0.005	-	< 0.005	< 0.005
Diethylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Dimethylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di-n-butylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Di-n-octylphthalate	g/m³	-	< 0.010	-	< 0.010	< 0.010
Other Halogenated compounds in SVOC Water Samples by GC-MS						
1,2-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,3-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,4-Dichlorobenzene	g/m³	-	< 0.010	-	< 0.010	< 0.010
Hexachlorobutadiene	g/m³	-	< 0.010	-	< 0.010	< 0.010
Hexachloroethane	g/m³	-	< 0.010	-	< 0.010	< 0.010
1,2,4-Trichlorobenzene	g/m³	-	< 0.005	-	< 0.005	< 0.005
Other compounds in SVOC Water Samples by GC-MS						
Benzyl alcohol	g/m³	-	< 0.05	-	< 0.05	< 0.05
Carbazole	g/m³	-	< 0.005	-	< 0.005	< 0.005
Dibenzofuran	g/m³	-	< 0.005	-	< 0.005	< 0.005
Isophorone	g/m³	-	< 0.005	-	< 0.005	< 0.005
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m³	-	0.62	-	< 0.10	< 0.10
C10 - C14	g/m³	-	1.1	-	< 0.2	< 0.2
C15 - C36	g/m³	-	< 0.4	-	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m³	-	1.8	-	< 0.7	< 0.7
Sample Name:		BH10_01 26-Sep-2024 4:00 pm				
Lab Number:		3680726.6				
Individual Tests						
Total Suspended Solids	g/m³	480				
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Dissolved Arsenic	g/m³	< 0.0010				
Dissolved Cadmium	g/m³	< 0.00005				
Dissolved Chromium	g/m³	< 0.0005				
Dissolved Copper	g/m³	< 0.0005				
Dissolved Lead	g/m³	< 0.00010				
Dissolved Nickel	g/m³	0.0013				
Dissolved Zinc	g/m³	0.0115				



Summary of Methods

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

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m³	1-3, 5-6
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-6
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m³	1-6
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m³	1-2, 4-5
Semivolatile Organic Compounds Screening in Water by GC-MS	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.003 - 0.10 g/m³	2, 4-5
Total Petroleum Hydrocarbons in Water			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.10 g/m³	2, 4-5
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m³	2, 4-5
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m³	2, 4-5
Total hydrocarbons (C7 - C36)	Calculation: Sum of carbon bands from C7 to C36. In-house based on US EPA 8015.	0.7 g/m³	2, 4-5

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

Testing was completed between 01-Oct-2024 and 04-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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Client Services Manager - Environmental

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Client:	Aurecon New Zealand Limited	Lab No:	3683704	SPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	07-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Aqueous

Sample Name:		BH17_01 30-Sep-2024	BH25_01 30-Sep-2024	BH38_01 30-Sep-2024	BH36_01 30-Sep-2024
Lab Number:		3683704.1	3683704.2	3683704.3	3683704.4
Individual Tests					
Total Suspended Solids	g/m ³	30	36	2,700	15,100
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn					
Dissolved Arsenic	g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium	g/m ³	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium	g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper	g/m ³	0.0005	0.0006	0.0024	< 0.0005
Dissolved Lead	g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel	g/m ³	< 0.0005	0.0017	0.0096	0.0055
Dissolved Zinc	g/m ³	0.0024	0.0098	0.0135	0.023
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq					
Acenaphthene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Anthracene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP)	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Chrysene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Fluoranthene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Fluorene	g/m ³	-	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene	g/m ³	-	< 0.00010	< 0.00010	< 0.00010
Naphthalene	g/m ³	-	< 0.0005	< 0.0005	< 0.0005
Phenanthrene	g/m ³	-	< 0.0004	< 0.0004	< 0.0004
Pyrene	g/m ³	-	< 0.0002	< 0.0002	< 0.0002
Total Petroleum Hydrocarbons in Water					
C7 - C9	g/m ³	-	-	< 0.10	< 0.10
C10 - C14	g/m ³	-	-	< 0.2	< 0.2
C15 - C36	g/m ³	-	-	< 0.4	< 0.4
Total hydrocarbons (C7 - C36)	g/m ³	-	-	< 0.7	< 0.7



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Summary of Methods

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

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m ³	1-4
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-4
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m ³	1-4
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m ³	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	3-4
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m ³	3-4
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m ³	3-4
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	3-4

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

Testing was completed between 02-Oct-2024 and 07-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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Client Services Manager - Environmental

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Client:	Aurecon New Zealand Limited	Lab No:	3690956	SPv1
Contact:	Hannah Sussex	Date Received:	10-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	17-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Add. Client Ref:	Sampled 10/10/24	
		Submitted By:	Hannah Sussex	

Sample Type: Aqueous

Sample Name:	BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:	3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Individual Tests					
Total Suspended Solids g/m ³	7,100	3,100	< 3	< 3	123
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn					
Dissolved Arsenic g/m ³	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Dissolved Cadmium g/m ³	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Dissolved Chromium g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dissolved Copper g/m ³	0.0021	0.0019	< 0.0005	< 0.0005	0.0008
Dissolved Lead g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dissolved Nickel g/m ³	0.0007	0.0010	< 0.0005	< 0.0005	0.0045
Dissolved Zinc g/m ³	0.0034	0.0043	< 0.0010	< 0.0010	0.0097
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq					
Acenaphthene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Acenaphthylene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Anthracene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]anthracene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[a]pyrene (BAP) g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[b]fluoranthene + Benzo[j]fluoranthene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[g,h,i]perylene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Benzo[k]fluoranthene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Chrysene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Dibenzo[a,h]anthracene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluoranthene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Fluorene g/m ³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Indeno(1,2,3-c,d)pyrene g/m ³	< 0.00010	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Naphthalene g/m ³	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Phenanthrene g/m ³	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Pyrene g/m ³	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Haloethers in SVOC Water Samples by GC-MS					
Bis(2-chloroethoxy) methane g/m ³	< 0.005	-	-	-	< 0.005
Bis(2-chloroethyl)ether g/m ³	< 0.005	-	-	-	< 0.005
Bis(2-chloroisopropyl)ether g/m ³	< 0.005	-	-	-	< 0.005
4-Bromophenyl phenyl ether g/m ³	< 0.005	-	-	-	< 0.005
4-Chlorophenyl phenyl ether g/m ³	< 0.005	-	-	-	< 0.005



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Sample Type: Aqueous						
Sample Name:		BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:		3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Nitrogen containing compounds in SVOC Water Samples by GC-MS*						
2,4-Dinitrotoluene	g/m ³	< 0.010	-	-	-	< 0.010
2,6-Dinitrotoluene	g/m ³	< 0.010	-	-	-	< 0.010
Nitrobenzene	g/m ³	< 0.005	-	-	-	< 0.005
N-Nitrosodi-n-propylamine	g/m ³	< 0.010	-	-	-	< 0.010
N-Nitrosodiphenylamine + Diphenylamine*	g/m ³	< 0.010	-	-	-	< 0.010
Organochlorine Pesticides in SVOC Water Samples by GC-MS						
Aldrin	g/m ³	< 0.005	-	-	-	< 0.005
alpha-BHC	g/m ³	< 0.005	-	-	-	< 0.005
beta-BHC	g/m ³	< 0.005	-	-	-	< 0.005
delta-BHC	g/m ³	< 0.005	-	-	-	< 0.005
gamma-BHC (Lindane)	g/m ³	< 0.005	-	-	-	< 0.005
4,4'-DDD	g/m ³	< 0.005	-	-	-	< 0.005
4,4'-DDE	g/m ³	< 0.005	-	-	-	< 0.005
4,4'-DDT	g/m ³	< 0.010	-	-	-	< 0.010
Dieldrin	g/m ³	< 0.005	-	-	-	< 0.005
Endosulfan I	g/m ³	< 0.010	-	-	-	< 0.010
Endosulfan II	g/m ³	< 0.010	-	-	-	< 0.010
Endosulfan sulphate	g/m ³	< 0.010	-	-	-	< 0.010
Endrin	g/m ³	< 0.010	-	-	-	< 0.010
Endrin ketone	g/m ³	< 0.010	-	-	-	< 0.010
Heptachlor	g/m ³	< 0.005	-	-	-	< 0.005
Heptachlor epoxide	g/m ³	< 0.005	-	-	-	< 0.005
Hexachlorobenzene	g/m ³	< 0.005	-	-	-	< 0.005
Polycyclic Aromatic Hydrocarbons in SVOC Water Samples by GC-MS						
Acenaphthene	g/m ³	< 0.003	-	-	-	< 0.003
Acenaphthylene	g/m ³	< 0.003	-	-	-	< 0.003
Anthracene	g/m ³	< 0.003	-	-	-	< 0.003
Benzo[a]anthracene	g/m ³	< 0.003	-	-	-	< 0.003
Benzo[a]pyrene (BAP)	g/m ³	< 0.003	-	-	-	< 0.003
Benzo[b]fluoranthene + Benzo[j] fluoranthene	g/m ³	< 0.003	-	-	-	< 0.003
Benzo[g,h,i]perylene	g/m ³	< 0.003	-	-	-	< 0.003
Benzo[k]fluoranthene	g/m ³	< 0.003	-	-	-	< 0.003
1&2-Chloronaphthalene	g/m ³	< 0.003	-	-	-	< 0.003
Chrysene	g/m ³	< 0.003	-	-	-	< 0.003
Dibenzo[a,h]anthracene	g/m ³	< 0.003	-	-	-	< 0.003
Fluoranthene	g/m ³	< 0.003	-	-	-	< 0.003
Fluorene	g/m ³	< 0.003	-	-	-	< 0.003
Indeno(1,2,3-c,d)pyrene	g/m ³	< 0.003	-	-	-	< 0.003
2-Methylnaphthalene	g/m ³	< 0.003	-	-	-	< 0.003
Naphthalene	g/m ³	< 0.003	-	-	-	< 0.003
Phenanthrene	g/m ³	< 0.003	-	-	-	< 0.003
Pyrene	g/m ³	< 0.003	-	-	-	< 0.003
Phenols in SVOC Water Samples by GC-MS						
4-Chloro-3-methylphenol	g/m ³	< 0.010	-	-	-	< 0.010
2-Chlorophenol	g/m ³	< 0.005	-	-	-	< 0.005
2,4-Dichlorophenol	g/m ³	< 0.005	-	-	-	< 0.005
2,4-Dimethylphenol	g/m ³	< 0.005	-	-	-	< 0.005
3 & 4-Methylphenol (m- + p-cresol)	g/m ³	< 0.010	-	-	-	< 0.010
2-Methylphenol (o-Cresol)	g/m ³	< 0.005	-	-	-	< 0.005
2-Nitrophenol	g/m ³	< 0.010	-	-	-	< 0.010
Pentachlorophenol (PCP)	g/m ³	< 0.10	-	-	-	< 0.10
Phenol	g/m ³	< 0.010	-	-	-	< 0.010
2,4,5-Trichlorophenol	g/m ³	< 0.010	-	-	-	< 0.010

Sample Type: Aqueous						
Sample Name:		BH14-01 10-Oct-2024	BH14A-02 10-Oct-2024	BH14B-03 10-Oct-2024	BH14C-04 10-Oct-2024	BH39-01 10-Oct-2024
Lab Number:		3690956.1	3690956.2	3690956.3	3690956.4	3690956.5
Phenols in SVOC Water Samples by GC-MS						
2,4,6-Trichlorophenol	g/m ³	< 0.010	-	-	-	< 0.010
Plasticisers in SVOC Water Samples by GC-MS						
Bis(2-ethylhexyl)phthalate	g/m ³	< 0.03	-	-	-	< 0.03
Butylbenzylphthalate	g/m ³	< 0.010	-	-	-	< 0.010
Di(2-ethylhexyl)adipate	g/m ³	< 0.005	-	-	-	< 0.005
Diethylphthalate	g/m ³	< 0.010	-	-	-	< 0.010
Dimethylphthalate	g/m ³	< 0.010	-	-	-	< 0.010
Di-n-butylphthalate	g/m ³	< 0.010	-	-	-	< 0.010
Di-n-octylphthalate	g/m ³	< 0.010	-	-	-	< 0.010
Other Halogenated compounds in SVOC Water Samples by GC-MS						
1,2-Dichlorobenzene	g/m ³	< 0.010	-	-	-	< 0.010
1,3-Dichlorobenzene	g/m ³	< 0.010	-	-	-	< 0.010
1,4-Dichlorobenzene	g/m ³	< 0.010	-	-	-	< 0.010
Hexachlorobutadiene	g/m ³	< 0.010	-	-	-	< 0.010
Hexachloroethane	g/m ³	< 0.010	-	-	-	< 0.010
1,2,4-Trichlorobenzene	g/m ³	< 0.005	-	-	-	< 0.005
Other compounds in SVOC Water Samples by GC-MS						
Benzyl alcohol	g/m ³	< 0.05	-	-	-	< 0.05
Carbazole	g/m ³	< 0.005	-	-	-	< 0.005
Dibenzofuran	g/m ³	< 0.005	-	-	-	< 0.005
Isophorone	g/m ³	< 0.005	-	-	-	< 0.005
Total Petroleum Hydrocarbons in Water						
C7 - C9	g/m ³	< 0.10	-	-	-	< 0.10
C10 - C14	g/m ³	< 0.2	-	-	-	< 0.2
C15 - C36	g/m ³	< 0.4	-	-	-	< 0.4
Total hydrocarbons (C7 - C36)	g/m ³	< 0.7	-	-	-	< 0.7

Summary of Methods

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

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D (modified) : Online Edition.	3 g/m ³	1-5
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B : Online Edition.	-	1-5
Heavy metals, dissolved, trace As,Cd,Cr,Cu,Ni,Pb,Zn	0.45µm Filtration, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.00005 - 0.0010 g/m ³	1-5
Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq	Liquid / liquid extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.00010 - 0.0005 g/m ³	1-5
Semivolatile Organic Compounds Screening in Water by GC-MS	Liquid / liquid extraction, GC-MS analysis. In-house based on US EPA 8270.	0.003 - 0.10 g/m ³	1, 5
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, 5
C10 - C14	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.2 g/m ³	1, 5
C15 - C36	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	0.4 g/m ³	1, 5
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, 5

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

Testing was completed between 12-Oct-2024 and 16-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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A handwritten signature in blue ink, consisting of several overlapping loops and a long horizontal stroke extending to the right.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3582989	SPv1
Contact:	Tiana Hill	Date Received:	16-May-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	20-May-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:		BH30_0.23m 13-May-2024	BH30_0.62m 13-May-2024
Lab Number:		3582989.1	3582989.2
Individual Tests			
Dry Matter	g/100g as rcvd	74	69
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	12	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.12	< 0.10
Total Recoverable Chromium	mg/kg dry wt	26	22
Total Recoverable Copper	mg/kg dry wt	20	5
Total Recoverable Lead	mg/kg dry wt	31	8.1
Total Recoverable Nickel	mg/kg dry wt	23	9
Total Recoverable Zinc	mg/kg dry wt	53	20
Organochlorine Pesticides Screening in Soil			
Aldrin	mg/kg dry wt	< 0.014	-
alpha-BHC	mg/kg dry wt	< 0.014	-
beta-BHC	mg/kg dry wt	< 0.014	-
delta-BHC	mg/kg dry wt	< 0.014	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.014	-
cis-Chlordane	mg/kg dry wt	< 0.014	-
trans-Chlordane	mg/kg dry wt	< 0.014	-
2,4'-DDD	mg/kg dry wt	< 0.014	-
4,4'-DDD	mg/kg dry wt	< 0.014	-
2,4'-DDE	mg/kg dry wt	< 0.014	-
4,4'-DDE	mg/kg dry wt	< 0.014	-
2,4'-DDT	mg/kg dry wt	< 0.014	-
4,4'-DDT	mg/kg dry wt	< 0.014	-
Total DDT Isomers	mg/kg dry wt	< 0.09	-
Dieldrin	mg/kg dry wt	< 0.014	-
Endosulfan I	mg/kg dry wt	< 0.014	-
Endosulfan II	mg/kg dry wt	< 0.014	-
Endosulfan sulphate	mg/kg dry wt	< 0.014	-
Endrin	mg/kg dry wt	< 0.014	-
Endrin aldehyde	mg/kg dry wt	< 0.014	-
Endrin ketone	mg/kg dry wt	< 0.014	-
Heptachlor	mg/kg dry wt	< 0.014	-
Heptachlor epoxide	mg/kg dry wt	< 0.014	-
Hexachlorobenzene	mg/kg dry wt	< 0.014	-
Methoxychlor	mg/kg dry wt	< 0.014	-



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Sample Type: Soil			
Sample Name:		BH30_0.23m 13-May-2024	BH30_0.62m 13-May-2024
Lab Number:		3582989.1	3582989.2
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Total of Reported PAHs in Soil	mg/kg dry wt	1.6	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.015
2-Methylnaphthalene	mg/kg dry wt	< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt	< 0.014	< 0.015
Acenaphthene	mg/kg dry wt	< 0.014	< 0.015
Anthracene	mg/kg dry wt	< 0.014	< 0.015
Benzo[a]anthracene	mg/kg dry wt	0.110	< 0.015
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.26	< 0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.35	< 0.035
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.35	< 0.035
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	0.23	< 0.015
Benzo[e]pyrene	mg/kg dry wt	0.135	< 0.015
Benzo[g,h,i]perylene	mg/kg dry wt	0.164	< 0.015
Benzo[k]fluoranthene	mg/kg dry wt	0.091	< 0.015
Chrysene	mg/kg dry wt	0.102	< 0.015
Dibenzo[a,h]anthracene	mg/kg dry wt	0.030	< 0.015
Fluoranthene	mg/kg dry wt	0.111	< 0.015
Fluorene	mg/kg dry wt	< 0.014	< 0.015
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.155	< 0.015
Naphthalene	mg/kg dry wt	< 0.07	< 0.08
Perylene	mg/kg dry wt	0.063	< 0.015
Phenanthrene	mg/kg dry wt	0.020	< 0.015
Pyrene	mg/kg dry wt	0.170	< 0.015

Summary of Methods

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

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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

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

Testing was completed between 17-May-2024 and 20-May-2024. For completion dates of individual analyses please contact the laboratory.

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

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Martin Cowell - BSc
Client Services Manager - Environmental

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Client:	Aurecon New Zealand Limited	Lab No:	3590857	SPv1
Contact:	Tiana Hill	Date Received:	24-May-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	28-May-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil

Sample Name:		BH22_0.2-0.3m 22-May-2024	BH22_0.6m 22-May-2024
Lab Number:		3590857.1	3590857.2
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	6	7
Total Recoverable Cadmium	mg/kg dry wt	0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	28	9
Total Recoverable Copper	mg/kg dry wt	23	3
Total Recoverable Lead	mg/kg dry wt	199	11.6
Total Recoverable Nickel	mg/kg dry wt	55	6
Total Recoverable Zinc	mg/kg dry wt	74	6

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2

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

Testing was completed between 25-May-2024 and 28-May-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental



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Client:	Aurecon New Zealand Limited	Lab No:	3620390	SPV2
Contact:	Tiana Hill	Date Received:	04-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	14-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil

Sample Name:	BH29_0.05-0.2 04-Jul-2024	BH48_0.05-0.2 04-Jul-2024	BH10_0.4-0.5 04-Jul-2024	BH10_1.0-1.1 04-Jul-2024
Lab Number:	3620390.1	3620390.2	3620390.4	3620390.5
Individual Tests				
Dry Matter g/100g as rcvd	-	-	79	70
TCLP Weight of Sample Taken g	-	50	-	-
TCLP Initial Sample pH pH Units	-	7.8	-	-
TCLP Acid Adjusted Sample pH pH Units	-	1.6	-	-
TCLP Extractant Type*	-	NaOH/Acetic acid at pH 4.93 +/- 0.05	-	-
TCLP Extraction Fluid pH pH Units	-	5.0	-	-
TCLP Post Extraction Sample pH pH Units	-	5.0	-	-
Heavy Metals, Screen Level				
Total Recoverable Arsenic mg/kg dry wt	12	6	5	7
Total Recoverable Cadmium mg/kg dry wt	0.32	0.44	0.15	0.11
Total Recoverable Chromium mg/kg dry wt	43	19	23	21
Total Recoverable Copper mg/kg dry wt	52	35	31	14
Total Recoverable Lead mg/kg dry wt	69	900	56	42
Total Recoverable Nickel mg/kg dry wt	80	18	26	12
Total Recoverable Zinc mg/kg dry wt	132	310	90	98
BTEX in Soil by Headspace GC-MS				
Benzene mg/kg dry wt	-	-	< 0.06	< 0.07
Toluene mg/kg dry wt	-	-	< 0.06	< 0.07
Ethylbenzene mg/kg dry wt	-	-	< 0.06	< 0.07
m&p-Xylene mg/kg dry wt	-	-	< 0.11	< 0.13
o-Xylene mg/kg dry wt	-	-	< 0.06	< 0.07
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil mg/kg dry wt	-	-	2.7	2.7
1-Methylnaphthalene mg/kg dry wt	-	-	< 0.013	< 0.014
2-Methylnaphthalene mg/kg dry wt	-	-	< 0.013	< 0.014
Acenaphthylene mg/kg dry wt	-	-	0.028	0.017
Acenaphthene mg/kg dry wt	-	-	< 0.013	< 0.014
Anthracene mg/kg dry wt	-	-	0.045	0.031
Benzo[a]anthracene mg/kg dry wt	-	-	0.167	0.181
Benzo[a]pyrene (BAP) mg/kg dry wt	-	-	0.25	0.25
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	-	-	0.35	0.37
Benzo[a]pyrene Toxic Equivalence (TEF)*	-	-	0.35	0.36
Benzo[b]fluoranthene + Benzo[j] fluoranthene mg/kg dry wt	-	-	0.25	0.28
Benzo[e]pyrene mg/kg dry wt	-	-	0.149	0.146
Benzo[g,h,i]perylene mg/kg dry wt	-	-	0.179	0.175



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Sample Type: Soil					
Sample Name:		BH29_0.05-0.2 04-Jul-2024	BH48_0.05-0.2 04-Jul-2024	BH10_0.4-0.5 04-Jul-2024	BH10_1.0-1.1 04-Jul-2024
Lab Number:		3620390.1	3620390.2	3620390.4	3620390.5
Polycyclic Aromatic Hydrocarbons Screening in Soil*					
Benzo[k]fluoranthene	mg/kg dry wt	-	-	0.100	0.108
Chrysene	mg/kg dry wt	-	-	0.169	0.179
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	0.032	0.032
Fluoranthene	mg/kg dry wt	-	-	0.40	0.45
Fluorene	mg/kg dry wt	-	-	0.013	< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	0.169	0.169
Naphthalene	mg/kg dry wt	-	-	< 0.07	< 0.07
Perylene	mg/kg dry wt	-	-	0.062	0.062
Phenanthrene	mg/kg dry wt	-	-	0.160	0.176
Pyrene	mg/kg dry wt	-	-	0.48	0.44
Total Petroleum Hydrocarbons in Soil					
C7 - C9	mg/kg dry wt	-	-	< 20	< 20
C10 - C14	mg/kg dry wt	-	-	< 20	< 20
C15 - C36	mg/kg dry wt	-	-	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	< 80	< 80

Sample Type: Aqueous		
Sample Name:		BH48_0.05-0.2 [TCLP Extract]
Lab Number:		3620390.7
Individual Tests		
Total Lead	g/m ³	0.55

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3620390-SPv1' issued on 10-Jul-2024 at 4:53 pm.
Reason for amendment: TCLP lead added to one sample.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2, 4-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	4-5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	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	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	4-5
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2, 4-5

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
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	4-5
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	4-5
TCLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1311.	-	2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	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	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	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	4-5
TCLP Profile			
TCLP Weight of Sample Taken	Gravimetric. US EPA 1311.	0.1 g	2
TCLP Initial Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Acid Adjusted Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Extractant Type*	US EPA 1311.	-	2
TCLP Extraction Fluid pH	pH meter. US EPA 1311.	0.1 pH Units	2
TCLP Post Extraction Sample pH	pH meter. US EPA 1311.	0.1 pH Units	2
Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Total Digestion of Extracted Samples*	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	7
Total Lead	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B : Online Edition.	0.0021 g/m ³	7

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

Testing was completed between 08-Jul-2024 and 14-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3624078	SPv1
Contact:	Tiana Hill	Date Received:	10-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	15-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH49_0.05-0.2 08-Jul-2024	BH49_0.3-0.4 08-Jul-2024	BH10_1.8-1.9 05-Jul-2024	BH10_3.3-3.4 05-Jul-2024	BH10_5.9-6.0 05-Jul-2024
Lab Number:	3624078.1	3624078.2	3624078.5	3624078.6	3624078.7

Individual Tests

Dry Matter	g/100g as rcvd	72	80	-	-	-
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	9	5	3	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	0.18	0.14	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	24	18	18	11	24
Total Recoverable Copper	mg/kg dry wt	40	28	14	11	16
Total Recoverable Lead	mg/kg dry wt	99	98	34	28	9.2
Total Recoverable Nickel	mg/kg dry wt	50	23	15	9	14
Total Recoverable Zinc	mg/kg dry wt	120	112	58	56	30

BTEX in Soil by Headspace GC-MS

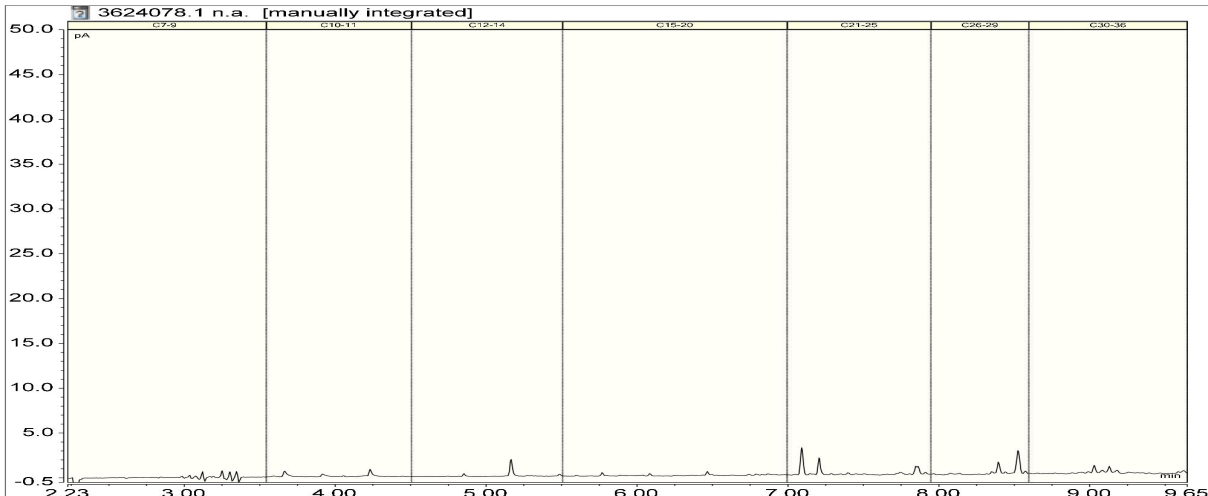
Benzene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Toluene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	< 0.06	-	-	-
m&p-Xylene	mg/kg dry wt	< 0.12	< 0.11	-	-	-
o-Xylene	mg/kg dry wt	< 0.06	< 0.06	-	-	-

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	16.8	4.9	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.013	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.019	-	-	-
Acenaphthylene	mg/kg dry wt	0.142	0.028	-	-	-
Acenaphthene	mg/kg dry wt	0.020	0.014	-	-	-
Anthracene	mg/kg dry wt	0.21	0.067	-	-	-
Benzo[a]anthracene	mg/kg dry wt	1.18	0.34	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	1.69	0.43	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	2.4	0.63	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	2.4	0.62	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	1.78	0.45	-	-	-
Benzo[e]pyrene	mg/kg dry wt	1.02	0.25	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	1.22	0.33	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.70	0.171	-	-	-
Chrysene	mg/kg dry wt	1.11	0.39	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.22	0.057	-	-	-
Fluoranthene	mg/kg dry wt	2.3	0.78	-	-	-
Fluorene	mg/kg dry wt	0.031	0.013	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	1.19	0.28	-	-	-



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Sample Type: Soil						
Sample Name:		BH49_0.05-0.2 08-Jul-2024	BH49_0.3-0.4 08-Jul-2024	BH10_1.8-1.9 05-Jul-2024	BH10_3.3-3.4 05-Jul-2024	BH10_5.9-6.0 05-Jul-2024
Lab Number:		3624078.1	3624078.2	3624078.5	3624078.6	3624078.7
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	-	-	-
Perylene	mg/kg dry wt	0.43	0.101	-	-	-
Phenanthrene	mg/kg dry wt	0.69	0.28	-	-	-
Pyrene	mg/kg dry wt	2.7	0.85	-	-	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	< 20	-	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	-	-	-
C15 - C36	mg/kg dry wt	110	< 40	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	142	< 80	-	-	-
Sample Name:		BH10_9.4-9.5 05-Jul-2024				
Lab Number:		3624078.8				
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2				
Total Recoverable Cadmium	mg/kg dry wt	< 0.10				
Total Recoverable Chromium	mg/kg dry wt	20				
Total Recoverable Copper	mg/kg dry wt	15				
Total Recoverable Lead	mg/kg dry wt	7.2				
Total Recoverable Nickel	mg/kg dry wt	20				
Total Recoverable Zinc	mg/kg dry wt	50				
3624078.1 BH49_0.05-0.2 08-Jul-2024 Client Chromatogram for TPH by FID						
3624078.1 n.a. [manually integrated] 						

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2, 5-8
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-2

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-2
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
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
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2, 5-8
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
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1-2
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	1
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2
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
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
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

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

Testing was completed between 11-Jul-2024 and 15-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Martin Cowell - BSc
Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3625593	SPv1
Contact:	Tiana Hill	Date Received:	11-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	17-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil			
Sample Name:		BH13_0.4-0.5 10-Jul-2024	
Lab Number:		3625593.2	
		3625593.4	
Individual Tests			
Dry Matter	g/100g as rcvd	73	68
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	5	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	40	24
Total Recoverable Copper	mg/kg dry wt	36	9
Total Recoverable Lead	mg/kg dry wt	187	6.8
Total Recoverable Nickel	mg/kg dry wt	35	5
Total Recoverable Zinc	mg/kg dry wt	85	14
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Total of Reported PAHs in Soil	mg/kg dry wt	1.8	< 0.4
1-Methylnaphthalene	mg/kg dry wt	< 0.014	< 0.015
2-Methylnaphthalene	mg/kg dry wt	< 0.03	< 0.03
Acenaphthylene	mg/kg dry wt	0.024	< 0.015
Acenaphthene	mg/kg dry wt	< 0.014	< 0.015
Anthracene	mg/kg dry wt	0.016	< 0.015
Benzo[a]anthracene	mg/kg dry wt	0.128	< 0.015
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.190	< 0.015
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.28	< 0.036
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.27	< 0.036
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.22	< 0.015
Benzo[e]pyrene	mg/kg dry wt	0.112	< 0.015
Benzo[g,h,i]perylene	mg/kg dry wt	0.145	< 0.015
Benzo[k]fluoranthene	mg/kg dry wt	0.077	< 0.015
Chrysene	mg/kg dry wt	0.104	< 0.015
Dibenzo[a,h]anthracene	mg/kg dry wt	0.027	< 0.015
Fluoranthene	mg/kg dry wt	0.22	< 0.015
Fluorene	mg/kg dry wt	< 0.014	< 0.015
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.142	< 0.015
Naphthalene	mg/kg dry wt	< 0.07	< 0.08
Perylene	mg/kg dry wt	0.042	< 0.015
Phenanthrene	mg/kg dry wt	0.059	< 0.015
Pyrene	mg/kg dry wt	0.25	< 0.015



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Sample Type: Soil			
Sample Name:		BH13_0.4-0.5 10-Jul-2024	BH13_1.4-1.5 10-Jul-2024
Lab Number:		3625593.2	3625593.4
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	< 30
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 90

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	2, 4
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	2, 4
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	2, 4
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	2, 4
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	2, 4
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	2, 4
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	2, 4
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	2, 4
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	2, 4
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	2, 4
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	2, 4

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

Testing was completed between 13-Jul-2024 and 17-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Martin Cowell - BSc
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3629193	SPV3
Contact:	Tiana Hill	Date Received:	17-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	12-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290 - 064	
		Submitted By:	Andrew Allcock	

Sample Type: Soil				
Sample Name:		BH39_0.5-0.6 16-Jul-2024	BH39_1.0-1.1 16-Jul-2024	BH39_1.5-1.6 16-Jul-2024
Lab Number:		3629193.1	3629193.2	3629193.3
Individual Tests				
Dry Matter	g/100g as rcvd	79	-	-
Total Recoverable Arsenic	mg/kg dry wt	-	4	-
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt	70	-	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	-	< 0.10
Total Recoverable Chromium	mg/kg dry wt	12	-	22
Total Recoverable Copper	mg/kg dry wt	10	-	21
Total Recoverable Lead	mg/kg dry wt	54	-	10.3
Total Recoverable Nickel	mg/kg dry wt	9	-	< 2
Total Recoverable Zinc	mg/kg dry wt	21	-	10
BTEX in Soil by Headspace GC-MS				
Benzene	mg/kg dry wt	< 0.06	-	-
Toluene	mg/kg dry wt	< 0.06	-	-
Ethylbenzene	mg/kg dry wt	< 0.06	-	-
m&p-Xylene	mg/kg dry wt	< 0.11	-	-
o-Xylene	mg/kg dry wt	< 0.06	-	-
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.013	-	-
Anthracene	mg/kg dry wt	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.013	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.013	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.030	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.030	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.013	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.013	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.013	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.013	-	-
Chrysene	mg/kg dry wt	< 0.013	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	-	-
Fluoranthene	mg/kg dry wt	< 0.013	-	-
Fluorene	mg/kg dry wt	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.013	-	-



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Sample Type: Soil				
Sample Name:		BH39_0.5-0.6 16-Jul-2024	BH39_1.0-1.1 16-Jul-2024	BH39_1.5-1.6 16-Jul-2024
Lab Number:		3629193.1	3629193.2	3629193.3
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Naphthalene	mg/kg dry wt	< 0.07	-	-
Perylene	mg/kg dry wt	< 0.013	-	-
Phenanthrene	mg/kg dry wt	< 0.013	-	-
Pyrene	mg/kg dry wt	< 0.013	-	-
Total Petroleum Hydrocarbons in Soil				
C7 - C9	mg/kg dry wt	< 20	-	-
C10 - C14	mg/kg dry wt	< 20	-	-
C15 - C36	mg/kg dry wt	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-	-

Analyst's Comments

It was observed that the container for sample {3629193.1} were not completely filled. Volatile loss may have occurred due to the headspace created in the container.

Amended Report: This certificate of analysis replaces report '3629193-SPv2' issued on 23-Jul-2024 at 3:27 pm.
Reason for amendment: Testing added to sample 2.

Summary of Methods

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

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	1
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1
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
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
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

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

Testing was completed between 18-Jul-2024 and 12-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3634409	SPv1
Contact:	Tiana Hill	Date Received:	24-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	29-Jul-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil						
Sample Name:		BH21_5.4-5.5 22-Jul-2024	BH21_11.0-11.1 22-Jul-2024	BH21_16.4-16.5 22-Jul-2024	BH35_3.4-3.5 22-Jul-2024	BH35_4.0-4.1 22-Jul-2024
Lab Number:		3634409.1	3634409.2	3634409.3	3634409.4	3634409.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	63	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	2	3	24	11
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	0.11	< 0.10
Total Recoverable Chromium	mg/kg dry wt	8	12	13	38	9
Total Recoverable Copper	mg/kg dry wt	14	10	11	31	21
Total Recoverable Lead	mg/kg dry wt	6.6	4.3	5.1	46	5.9
Total Recoverable Nickel	mg/kg dry wt	9	11	10	94	64
Total Recoverable Zinc	mg/kg dry wt	10	43	40	15	118
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	< 0.4	-
1-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.016	-
2-Methylnaphthalene	mg/kg dry wt	-	-	-	< 0.016	-
Acenaphthylene	mg/kg dry wt	-	-	-	< 0.016	-
Acenaphthene	mg/kg dry wt	-	-	-	< 0.016	-
Anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	< 0.039	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	< 0.039	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[e]pyrene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	< 0.016	-
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Chrysene	mg/kg dry wt	-	-	-	< 0.016	-
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	< 0.016	-
Fluoranthene	mg/kg dry wt	-	-	-	< 0.016	-
Fluorene	mg/kg dry wt	-	-	-	< 0.016	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	< 0.016	-
Naphthalene	mg/kg dry wt	-	-	-	< 0.08	-
Perylene	mg/kg dry wt	-	-	-	< 0.016	-
Phenanthrene	mg/kg dry wt	-	-	-	< 0.016	-
Pyrene	mg/kg dry wt	-	-	-	< 0.016	-



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Sample Type: Soil						
Sample Name:		BH21_5.4-5.5 22-Jul-2024	BH21_11.0-11.1 22-Jul-2024	BH21_16.4-16.5 22-Jul-2024	BH35_3.4-3.5 22-Jul-2024	BH35_4.0-4.1 22-Jul-2024
Lab Number:		3634409.1	3634409.2	3634409.3	3634409.4	3634409.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 30	-
C10 - C14	mg/kg dry wt	-	-	-	< 20	-
C15 - C36	mg/kg dry wt	-	-	-	< 40	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 90	-

Sample Name:		BH39_3.0-3.45 22-Jul-2024	BH39_6.0-6.45 22-Jul-2024	BH39_9.0-9.45 22-Jul-2024	BH39_12.0-12.45 22-Jul-2024	BH48_3.0-3.1 22-Jul-2024
Lab Number:		3634409.6	3634409.7	3634409.8	3634409.9	3634409.10
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4	4	5	5	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	15	20	16	22	16
Total Recoverable Copper	mg/kg dry wt	33	30	31	25	15
Total Recoverable Lead	mg/kg dry wt	10.9	8.2	8.8	7.7	5.3
Total Recoverable Nickel	mg/kg dry wt	5	57	20	18	24
Total Recoverable Zinc	mg/kg dry wt	21	47	69	60	68

Sample Name:		BH48_6.5-6.7 22-Jul-2024	BH49_2.7-2.8 22-Jul-2024	BH49_5.0-5.1 22-Jul-2024	BH49_5.9-6.0 22-Jul-2024
Lab Number:		3634409.11	3634409.12	3634409.13	3634409.14
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	3	2	< 2	2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	25	19	19	20
Total Recoverable Copper	mg/kg dry wt	15	12	18	13
Total Recoverable Lead	mg/kg dry wt	5.0	4.8	6.6	4.4
Total Recoverable Nickel	mg/kg dry wt	25	3	< 2	12
Total Recoverable Zinc	mg/kg dry wt	59	21	5	36

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-14
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	4
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	4
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	4
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	4

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	4
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-14
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	4
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	4
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	4
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	4

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

Testing was completed between 25-Jul-2024 and 29-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3651482	SPv1
Contact:	Tiana Hill	Date Received:	16-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	21-Aug-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH44_0.3-0.4 14-Aug-2024	BH44_1.1-1.2 14-Aug-2024	BH44_3.0-3.4 15-Aug-2024	BH44_6.0-6.3 15-Aug-2024	BH44_10.5-10.6 15-Aug-2024
Lab Number:	3651482.1	3651482.2	3651482.3	3651482.4	3651482.5

Individual Tests

Dry Matter	g/100g as rcvd	76	62	79	-	-
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	3	4	< 2	< 2	2
Total Recoverable Cadmium	mg/kg dry wt	0.17	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	15	22	18	24	27
Total Recoverable Copper	mg/kg dry wt	16	22	6	11	16
Total Recoverable Lead	mg/kg dry wt	54	45	15.3	6.1	5.4
Total Recoverable Nickel	mg/kg dry wt	14	18	5	12	14
Total Recoverable Zinc	mg/kg dry wt	61	47	41	31	45

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	0.7	1.1	< 0.3	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Anthracene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Benzo[a]anthracene	mg/kg dry wt	0.050	0.073	0.014	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.073	0.096	0.024	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.105	0.138	0.031	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.104	0.137	0.030	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.079	0.109	0.027	-	-
Benzo[e]pyrene	mg/kg dry wt	0.042	0.058	0.014	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.053	0.065	0.018	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.027	0.036	< 0.013	-	-
Chrysene	mg/kg dry wt	0.046	0.070	0.015	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Fluoranthene	mg/kg dry wt	0.107	0.168	0.039	-	-
Fluorene	mg/kg dry wt	< 0.013	< 0.016	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.052	0.063	0.017	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.08	< 0.07	-	-
Perylene	mg/kg dry wt	0.017	0.023	< 0.013	-	-
Phenanthrene	mg/kg dry wt	0.034	0.088	0.017	-	-
Pyrene	mg/kg dry wt	0.118	0.168	0.038	-	-



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Sample Type: Soil						
Sample Name:		BH44_0.3-0.4 14-Aug-2024	BH44_1.1-1.2 14-Aug-2024	BH44_3.0-3.4 15-Aug-2024	BH44_6.0-6.3 15-Aug-2024	BH44_10.5-10.6 15-Aug-2024
Lab Number:		3651482.1	3651482.2	3651482.3	3651482.4	3651482.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	< 30	< 20	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	-	-
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 90	< 80	-	-
Sample Name:		BH51_0.5-0.6 15-Aug-2024		BH51_2.0-2.45 15-Aug-2024		
Lab Number:		3651482.6		3651482.7		
Individual Tests						
Dry Matter	g/100g as rcvd	79		61		
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	4		3		
Total Recoverable Cadmium	mg/kg dry wt	< 0.10		< 0.10		
Total Recoverable Chromium	mg/kg dry wt	27		20		
Total Recoverable Copper	mg/kg dry wt	34		8		
Total Recoverable Lead	mg/kg dry wt	62		9.8		
Total Recoverable Nickel	mg/kg dry wt	48		10		
Total Recoverable Zinc	mg/kg dry wt	65		44		
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	0.7		< 0.4		
1-Methylnaphthalene	mg/kg dry wt	< 0.013		< 0.016		
2-Methylnaphthalene	mg/kg dry wt	< 0.013		< 0.016		
Acenaphthylene	mg/kg dry wt	< 0.013		< 0.016		
Acenaphthene	mg/kg dry wt	< 0.013		< 0.016		
Anthracene	mg/kg dry wt	< 0.013		< 0.016		
Benzo[a]anthracene	mg/kg dry wt	0.057		< 0.016		
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.066		< 0.016		
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.100		< 0.039		
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.099		< 0.038		
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.083		< 0.016		
Benzo[e]pyrene	mg/kg dry wt	0.038		< 0.016		
Benzo[g,h,i]perylene	mg/kg dry wt	0.043		< 0.016		
Benzo[k]fluoranthene	mg/kg dry wt	0.032		< 0.016		
Chrysene	mg/kg dry wt	0.050		< 0.016		
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.013		< 0.016		
Fluoranthene	mg/kg dry wt	0.103		< 0.016		
Fluorene	mg/kg dry wt	< 0.013		< 0.016		
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.051		< 0.016		
Naphthalene	mg/kg dry wt	< 0.07		< 0.08		
Perylene	mg/kg dry wt	0.024		< 0.016		
Phenanthrene	mg/kg dry wt	0.017		< 0.016		
Pyrene	mg/kg dry wt	0.110		< 0.016		
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20		< 30		
C10 - C14	mg/kg dry wt	< 20		< 20		
C15 - C36	mg/kg dry wt	< 40		< 40		
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80		< 90		

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-3, 6-7
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-3, 6-7
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	1-3, 6-7
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	1-3, 6-7
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1-3, 6-7
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3, 6-7
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3, 6-7
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-3, 6-7
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	1-3, 6-7

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

Testing was completed between 17-Aug-2024 and 21-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3655466	SPV2
Contact:	Andrew Allcock	Date Received:	22-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	28-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:	126272	
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil						
Sample Name:		BH46_0.4-0.5 19-Aug-2024	BH46_1.4-1.6 19-Aug-2024	BH45_0.8-1.0 19-Aug-2024	BH51_5.0-5.45 15-Aug-2024	BH51_8.0-8.45 15-Aug-2024
Lab Number:		3655466.1	3655466.2	3655466.3	3655466.4	3655466.5
Individual Tests						
Dry Matter	g/100g as rcvd	78	80	76	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	3	3	5	< 2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	21	20	22	14	23
Total Recoverable Copper	mg/kg dry wt	16	16	26	9	21
Total Recoverable Lead	mg/kg dry wt	27	16.7	47	7.3	8.4
Total Recoverable Nickel	mg/kg dry wt	12	12	18	11	21
Total Recoverable Zinc	mg/kg dry wt	41	43	80	36	52
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	3.3	< 0.3	2.2	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
Acenaphthylene	mg/kg dry wt	0.037	< 0.013	0.027	-	-
Acenaphthene	mg/kg dry wt	< 0.013	< 0.013	< 0.013	-	-
Anthracene	mg/kg dry wt	0.051	< 0.013	0.023	-	-
Benzo[a]anthracene	mg/kg dry wt	0.21	0.016	0.147	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.173	0.013	0.125	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.30	< 0.030	0.22	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.30	< 0.030	0.21	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.30	0.024	0.21	-	-
Benzo[e]pyrene	mg/kg dry wt	0.28	0.021	0.20	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.22	0.018	0.165	-	-
Benzo[k]fluoranthene	mg/kg dry wt	0.115	< 0.013	0.080	-	-
Chrysene	mg/kg dry wt	0.21	0.015	0.140	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.039	< 0.013	0.028	-	-
Fluoranthene	mg/kg dry wt	0.58	0.047	0.36	-	-
Fluorene	mg/kg dry wt	0.013	< 0.013	< 0.013	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.21	0.016	0.154	-	-
Naphthalene	mg/kg dry wt	< 0.07	< 0.07	< 0.07	-	-
Perylene	mg/kg dry wt	0.072	< 0.013	0.053	-	-
Phenanthrene	mg/kg dry wt	0.196	0.013	0.093	-	-
Pyrene	mg/kg dry wt	0.56	0.047	0.38	-	-



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

Sample Type: Soil						
Sample Name:		BH46_0.4-0.5 19-Aug-2024	BH46_1.4-1.6 19-Aug-2024	BH45_0.8-1.0 19-Aug-2024	BH51_5.0-5.45 15-Aug-2024	BH51_8.0-8.45 15-Aug-2024
Lab Number:		3655466.1	3655466.2	3655466.3	3655466.4	3655466.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	< 20	< 20	-	-
C10 - C14	mg/kg dry wt	< 20	< 20	< 20	-	-
C15 - C36	mg/kg dry wt	< 40	< 40	< 40	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 80	< 80	-	-

Sample Name:		BH51_12.0-12.33 15-Aug-2024	
Lab Number:		3655466.6	
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	2	
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	
Total Recoverable Chromium	mg/kg dry wt	23	
Total Recoverable Copper	mg/kg dry wt	20	
Total Recoverable Lead	mg/kg dry wt	5.8	
Total Recoverable Nickel	mg/kg dry wt	17	
Total Recoverable Zinc	mg/kg dry wt	49	

Analyst's Comments

Amended Report: This certificate of analysis replaces report '3655466-SPv1' issued on 28-Aug-2024 at 9:52 am.
Reason for amendment: IDs updated.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-6
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1-3
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-3
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	1-3
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	1-3
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1-3
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-6
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3
C10 - C14	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	20 mg/kg dry wt	1-3

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
C15 - C36	Solvent extraction, GC-FID analysis. Tested on as received sample. In-house based on US EPA 8015.	40 mg/kg dry wt	1-3
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	1-3

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

Testing was completed between 24-Aug-2024 and 28-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3658963	SPv1
Contact:	Tiana Hill	Date Received:	28-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	02-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH46_3.5-3.6 23-Aug-2024	BH46_8.5-8.7 23-Aug-2024	BH46_12.0-12.1 23-Aug-2024	BH25_0.2-0.3 26-Aug-2024	BH25_1.5-1.6 26-Aug-2024
Lab Number:	3658963.1	3658963.2	3658963.3	3658963.4	3658963.5

Individual Tests

Dry Matter	g/100g as rcvd	74	-	-	69	-
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Heavy Metals, Screen Level

Total Recoverable Arsenic	mg/kg dry wt	5	3	< 2	3	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	24	19	28	26	11
Total Recoverable Copper	mg/kg dry wt	22	19	19	30	5
Total Recoverable Lead	mg/kg dry wt	75	5.6	4.4	21	12.4
Total Recoverable Nickel	mg/kg dry wt	18	19	15	48	3
Total Recoverable Zinc	mg/kg dry wt	65	52	51	35	16

Polycyclic Aromatic Hydrocarbons Screening in Soil*

Total of Reported PAHs in Soil	mg/kg dry wt	9.7	-	-	23	-
1-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	0.030	-
2-Methylnaphthalene	mg/kg dry wt	< 0.013	-	-	0.019	-
Acenaphthylene	mg/kg dry wt	0.121	-	-	0.025	-
Acenaphthene	mg/kg dry wt	< 0.013	-	-	0.195	-
Anthracene	mg/kg dry wt	0.25	-	-	0.85	-
Benzo[a]anthracene	mg/kg dry wt	0.76	-	-	1.73	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.77	-	-	1.78	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	1.12	-	-	2.6	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	1.11	-	-	2.6	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.80	-	-	1.81	-
Benzo[e]pyrene	mg/kg dry wt	0.43	-	-	0.97	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.46	-	-	1.06	-
Benzo[k]fluoranthene	mg/kg dry wt	0.32	-	-	0.71	-
Chrysene	mg/kg dry wt	0.66	-	-	1.59	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.098	-	-	0.23	-
Fluoranthene	mg/kg dry wt	1.79	-	-	3.7	-
Fluorene	mg/kg dry wt	0.050	-	-	0.23	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.46	-	-	1.10	-
Naphthalene	mg/kg dry wt	< 0.07	-	-	< 0.08	-
Perylene	mg/kg dry wt	0.172	-	-	0.41	-
Phenanthrene	mg/kg dry wt	0.76	-	-	2.8	-
Pyrene	mg/kg dry wt	1.75	-	-	4.0	-



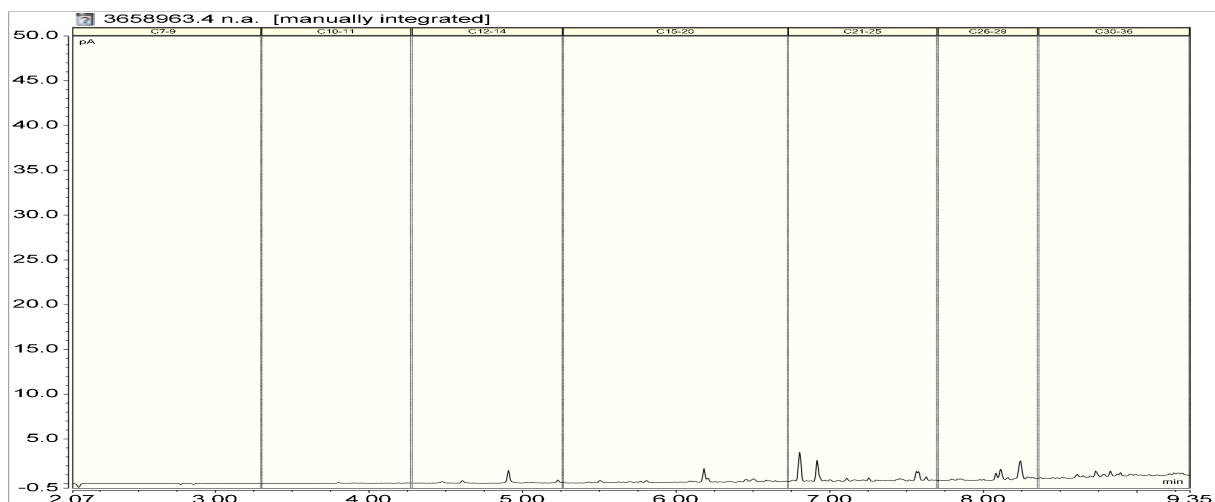
This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported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

Sample Type: Soil						
Sample Name:		BH46_3.5-3.6 23-Aug-2024	BH46_8.5-8.7 23-Aug-2024	BH46_12.0-12.1 23-Aug-2024	BH25_0.2-0.3 26-Aug-2024	BH25_1.5-1.6 26-Aug-2024
Lab Number:		3658963.1	3658963.2	3658963.3	3658963.4	3658963.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 20	-	-	< 30	-
C10 - C14	mg/kg dry wt	< 20	-	-	< 20	-
C15 - C36	mg/kg dry wt	< 40	-	-	141	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-	-	143	-

3658963.4

BH25_0.2-0.3 26-Aug-2024

Client Chromatogram for TPH by FID



Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1, 4
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1, 4
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, 4
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, 4
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1, 4

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	4
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1, 4
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, 4
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, 4
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, 4

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

Testing was completed between 29-Aug-2024 and 02-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3664138	SPv1
Contact:	Tiana Hill	Date Received:	04-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	09-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil			
Sample Name:		BH06_0.4-0.5 29-Aug-2024	
Lab Number:		3664138.1	
		3664138.2	
Individual Tests			
Dry Matter	g/100g as rcvd	72	-
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	5	3
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	22	23
Total Recoverable Copper	mg/kg dry wt	26	35
Total Recoverable Lead	mg/kg dry wt	89	8.9
Total Recoverable Nickel	mg/kg dry wt	22	5
Total Recoverable Zinc	mg/kg dry wt	68	30
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Total of Reported PAHs in Soil	mg/kg dry wt	3.4	-
1-Methylnaphthalene	mg/kg dry wt	< 0.014	-
2-Methylnaphthalene	mg/kg dry wt	< 0.014	-
Acenaphthylene	mg/kg dry wt	0.040	-
Acenaphthene	mg/kg dry wt	< 0.014	-
Anthracene	mg/kg dry wt	0.057	-
Benzo[a]anthracene	mg/kg dry wt	0.22	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	0.35	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	0.49	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	0.49	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	0.36	-
Benzo[e]pyrene	mg/kg dry wt	0.199	-
Benzo[g,h,i]perylene	mg/kg dry wt	0.27	-
Benzo[k]fluoranthene	mg/kg dry wt	0.141	-
Chrysene	mg/kg dry wt	0.20	-
Dibenzo[a,h]anthracene	mg/kg dry wt	0.041	-
Fluoranthene	mg/kg dry wt	0.44	-
Fluorene	mg/kg dry wt	< 0.014	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	0.27	-
Naphthalene	mg/kg dry wt	< 0.07	-
Perylene	mg/kg dry wt	0.092	-
Phenanthrene	mg/kg dry wt	0.129	-
Pyrene	mg/kg dry wt	0.51	-



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Sample Type: Soil			
Sample Name:		BH06_0.4-0.5 29-Aug-2024	BH06_1.4-1.5 29-Aug-2024
Lab Number:		3664138.1	3664138.2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	-
C10 - C14	mg/kg dry wt	< 20	-
C15 - C36	mg/kg dry wt	< 40	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	-

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1
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
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
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1
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
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
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

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

Testing was completed between 05-Sep-2024 and 09-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Client Services Manager - Environmental

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3670643	SPv1
Contact:	Tiana Hill	Date Received:	12-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	16-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil						
Sample Name:		BH36_0.6-0.7 12-Sep-2024	BH36_2.5-2.6 12-Sep-2024	BH06_12.0-12.1 12-Sep-2024	BH25_16.5-16.6 12-Sep-2024	BH17_1.5-1.95 05-Sep-2024
Lab Number:		3670643.1	3670643.2	3670643.3	3670643.4	3670643.5
Individual Tests						
Dry Matter	g/100g as rcvd	66	-	-	-	-
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2	3	4	3	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	14	15	20	10	9
Total Recoverable Copper	mg/kg dry wt	4	9	23	11	3
Total Recoverable Lead	mg/kg dry wt	6.5	6.3	6.3	4.7	7.3
Total Recoverable Nickel	mg/kg dry wt	4	< 2	33	11	2
Total Recoverable Zinc	mg/kg dry wt	5	7	70	36	7
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	< 0.4	-	-	-	-
1-Methylnaphthalene	mg/kg dry wt	< 0.015	-	-	-	-
2-Methylnaphthalene	mg/kg dry wt	< 0.015	-	-	-	-
Acenaphthylene	mg/kg dry wt	< 0.015	-	-	-	-
Acenaphthene	mg/kg dry wt	< 0.015	-	-	-	-
Anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 0.036	-	-	-	-
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 0.036	-	-	-	-
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[e]pyrene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.015	-	-	-	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Chrysene	mg/kg dry wt	< 0.015	-	-	-	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.015	-	-	-	-
Fluoranthene	mg/kg dry wt	< 0.015	-	-	-	-
Fluorene	mg/kg dry wt	< 0.015	-	-	-	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.015	-	-	-	-
Naphthalene	mg/kg dry wt	< 0.08	-	-	-	-
Perylene	mg/kg dry wt	< 0.015	-	-	-	-
Phenanthrene	mg/kg dry wt	< 0.015	-	-	-	-
Pyrene	mg/kg dry wt	< 0.015	-	-	-	-



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Sample Type: Soil						
Sample Name:		BH36_0.6-0.7 12-Sep-2024	BH36_2.5-2.6 12-Sep-2024	BH06_12.0-12.1 12-Sep-2024	BH25_16.5-16.6 12-Sep-2024	BH17_1.5-1.95 05-Sep-2024
Lab Number:		3670643.1	3670643.2	3670643.3	3670643.4	3670643.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 30	-	-	-	-
C10 - C14	mg/kg dry wt	< 20	-	-	-	-
C15 - C36	mg/kg dry wt	< 40	-	-	-	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 90	-	-	-	-

Sample Name:		BH17_7.5-7.95 05-Sep-2024	BH17_13.5-13.64 06-Sep-2024
Lab Number:		3670643.6	3670643.7
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	2	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	19	26
Total Recoverable Copper	mg/kg dry wt	25	16
Total Recoverable Lead	mg/kg dry wt	7.7	5.2
Total Recoverable Nickel	mg/kg dry wt	16	22
Total Recoverable Zinc	mg/kg dry wt	23	40

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-7
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	1
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1
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
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
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-7
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1
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
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
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

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

Testing was completed between 13-Sep-2024 and 16-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 4

Client:	Aurecon New Zealand Limited	Lab No:	3674838	SPv1
Contact:	Tiana Hill	Date Received:	18-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	23-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-64	
		Submitted By:	Tiana Hill	

Sample Type: Soil				
Sample Name:		BH38_1.1-1.2 18-Sep-2024		BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674838.1		3674838.2
Individual Tests				
Dry Matter	g/100g as rcvd	79		70
Heavy Metals, Screen Level				
Total Recoverable Arsenic	mg/kg dry wt	< 2		8
Total Recoverable Cadmium	mg/kg dry wt	< 0.10		< 0.10
Total Recoverable Chromium	mg/kg dry wt	7		23
Total Recoverable Copper	mg/kg dry wt	4		18
Total Recoverable Lead	mg/kg dry wt	16.9		114
Total Recoverable Nickel	mg/kg dry wt	2		24
Total Recoverable Zinc	mg/kg dry wt	10		46
BTEX in Soil by Headspace GC-MS				
Benzene	mg/kg dry wt	< 0.06		< 0.07
Toluene	mg/kg dry wt	< 0.06		< 0.07
Ethylbenzene	mg/kg dry wt	< 0.06		< 0.07
m&p-Xylene	mg/kg dry wt	< 0.11		< 0.13
o-Xylene	mg/kg dry wt	< 0.06		< 0.07
Polycyclic Aromatic Hydrocarbons Screening in Soil*				
Total of Reported PAHs in Soil	mg/kg dry wt	-		2.4
1-Methylnaphthalene	mg/kg dry wt	-		< 0.014
2-Methylnaphthalene	mg/kg dry wt	-		< 0.014
Acenaphthylene	mg/kg dry wt	-		0.019
Acenaphthene	mg/kg dry wt	-		< 0.014
Anthracene	mg/kg dry wt	-		0.026
Benzo[a]anthracene	mg/kg dry wt	-		0.175
Benzo[a]pyrene (BAP)	mg/kg dry wt	-		0.25
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-		0.36
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-		0.35
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-		0.23
Benzo[e]pyrene	mg/kg dry wt	-		0.134
Benzo[g,h,i]perylene	mg/kg dry wt	-		0.180
Benzo[k]fluoranthene	mg/kg dry wt	-		0.102
Chrysene	mg/kg dry wt	-		0.164
Dibenzo[a,h]anthracene	mg/kg dry wt	-		0.033
Fluoranthene	mg/kg dry wt	-		0.33
Fluorene	mg/kg dry wt	-		< 0.014
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-		0.168
Naphthalene	mg/kg dry wt	-		< 0.07



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Sample Type: Soil			
Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674838.1	3674838.2
Polycyclic Aromatic Hydrocarbons Screening in Soil*			
Perylene	mg/kg dry wt	-	0.063
Phenanthrene	mg/kg dry wt	-	0.110
Pyrene	mg/kg dry wt	-	0.41
Haloethers in SVOC Soil Samples by GC-MS			
Bis(2-chloroethoxy) methane	mg/kg dry wt	< 0.5	-
Bis(2-chloroethyl)ether	mg/kg dry wt	< 0.5	-
Bis(2-chloroisopropyl)ether	mg/kg dry wt	< 0.5	-
4-Bromophenyl phenyl ether	mg/kg dry wt	< 0.4	-
4-Chlorophenyl phenyl ether	mg/kg dry wt	< 0.5	-
Nitrogen containing compounds in SVOC Soil Samples by GC-MS			
2,4-Dinitrotoluene	mg/kg dry wt	< 1.0	-
2,6-Dinitrotoluene	mg/kg dry wt	< 1.0	-
Nitrobenzene	mg/kg dry wt	< 0.5	-
N-Nitrosodi-n-propylamine	mg/kg dry wt	< 0.8	-
N-Nitrosodiphenylamine + Diphenylamine	mg/kg dry wt	< 0.8	-
Organochlorine Pesticides in SVOC Soil Samples by GC-MS			
Aldrin	mg/kg dry wt	< 0.5	-
alpha-BHC	mg/kg dry wt	< 0.5	-
beta-BHC	mg/kg dry wt	< 0.5	-
delta-BHC	mg/kg dry wt	< 0.5	-
gamma-BHC (Lindane)	mg/kg dry wt	< 0.5	-
4,4'-DDD	mg/kg dry wt	< 0.5	-
4,4'-DDE	mg/kg dry wt	< 0.5	-
4,4'-DDT	mg/kg dry wt	< 1.0	-
Dieldrin	mg/kg dry wt	< 0.5	-
Endosulfan I	mg/kg dry wt	< 1.0	-
Endosulfan II	mg/kg dry wt	< 2	-
Endosulfan sulphate	mg/kg dry wt	< 1.0	-
Endrin	mg/kg dry wt	< 0.8	-
Endrin ketone	mg/kg dry wt	< 1.0	-
Heptachlor	mg/kg dry wt	< 0.5	-
Heptachlor epoxide	mg/kg dry wt	< 0.5	-
Hexachlorobenzene	mg/kg dry wt	< 0.5	-
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*			
Acenaphthene	mg/kg dry wt	< 0.5	-
Acenaphthylene	mg/kg dry wt	< 0.5	-
Anthracene	mg/kg dry wt	< 0.5	-
Benzo[a]anthracene	mg/kg dry wt	< 0.5	-
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.5	-
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.5	-
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.5	-
Benzo[k]fluoranthene	mg/kg dry wt	< 0.5	-
1&2-Chloronaphthalene	mg/kg dry wt	< 0.5	-
Chrysene	mg/kg dry wt	< 0.5	-
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.5	-
Fluoranthene	mg/kg dry wt	< 0.5	-
Fluorene	mg/kg dry wt	< 0.5	-
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.5	-
2-Methylnaphthalene	mg/kg dry wt	< 0.5	-
Naphthalene	mg/kg dry wt	< 0.5	-
Phenanthrene	mg/kg dry wt	< 0.5	-
Pyrene	mg/kg dry wt	< 0.5	-
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	< 1.3	-

Sample Type: Soil			
Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024
Lab Number:		3674838.1	3674838.2
Polycyclic Aromatic Hydrocarbons in SVOC Soil Samples by GC-MS*			
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	< 1.3	-
Phenols in SVOC Soil Samples by GC-MS			
4-Chloro-3-methylphenol	mg/kg dry wt	< 5	-
2-Chlorophenol	mg/kg dry wt	< 1.0	-
2,4-Dichlorophenol	mg/kg dry wt	< 1.0	-
2,4-Dimethylphenol	mg/kg dry wt	< 3	-
3 & 4-Methylphenol (m- + p-cresol)	mg/kg dry wt	< 3	-
2-Methylphenol (o-cresol)	mg/kg dry wt	< 1.0	-
2-Nitrophenol	mg/kg dry wt	< 5	-
Pentachlorophenol (PCP)	mg/kg dry wt	< 30	-
Phenol	mg/kg dry wt	< 1.0	-
2,4,5-Trichlorophenol	mg/kg dry wt	< 1.0	-
2,4,6-Trichlorophenol	mg/kg dry wt	< 1.0	-
Plasticisers in SVOC Soil Samples by GC-MS			
Bis(2-ethylhexyl)phthalate	mg/kg dry wt	< 5	-
Butylbenzylphthalate	mg/kg dry wt	< 1.0	-
Di(2-ethylhexyl)adipate	mg/kg dry wt	< 1.0	-
Diethylphthalate	mg/kg dry wt	< 1.0	-
Dimethylphthalate	mg/kg dry wt	< 1.0	-
Di-n-butylphthalate	mg/kg dry wt	< 1.0	-
Di-n-octylphthalate	mg/kg dry wt	< 1.0	-
Other Halogenated compounds in SVOC Soil Samples by GC-MS			
1,2-Dichlorobenzene	mg/kg dry wt	< 0.8	-
1,3-Dichlorobenzene	mg/kg dry wt	< 0.8	-
1,4-Dichlorobenzene	mg/kg dry wt	< 0.8	-
Hexachlorobutadiene	mg/kg dry wt	< 0.8	-
Hexachloroethane	mg/kg dry wt	< 0.8	-
1,2,4-Trichlorobenzene	mg/kg dry wt	< 0.5	-
Other compounds in SVOC Soil Samples by GC-MS			
Benzyl alcohol	mg/kg dry wt	< 10	-
Carbazole	mg/kg dry wt	< 0.5	-
Dibenzofuran	mg/kg dry wt	< 0.5	-
Isophorone	mg/kg dry wt	< 0.5	-
Total Petroleum Hydrocarbons in Soil			
C7 - C9	mg/kg dry wt	< 20	< 20
C10 - C14	mg/kg dry wt	< 20	< 20
C15 - C36	mg/kg dry wt	< 40	< 40
Total hydrocarbons (C7 - C36)	mg/kg dry wt	< 80	< 80

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-2
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	2

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1-2
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	2
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	2
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-2
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
Polycyclic Aromatic Hydrocarbons Screening in Soil*	Sonication extraction, GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.010 - 0.05 mg/kg dry wt	2
Semivolatile Organic Compounds Screening in Soil by GC-MS	Sonication extraction, GC-MS analysis. Tested on as received sample. In-house based on US EPA 8270.	0.024 - 30 mg/kg dry wt	1
Total Petroleum Hydrocarbons in Soil			
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	1-2
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
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
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

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

Testing was completed between 19-Sep-2024 and 23-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3683703	SPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	04-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil						
Sample Name:		BH36_5.45 12-Sep-2024	BH14_10.0-10.1 30-Sep-2024	BH14_2.5-2.6 30-Sep-2024	BH43_2.3 25-Sep-2024	BH43_0.5-0.6 24-Sep-2024
Lab Number:		3683703.1	3683703.2	3683703.3	3683703.4	3683703.5
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	-	75
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	5	2	< 2	< 2	5
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	10	20	7	35	16
Total Recoverable Copper	mg/kg dry wt	34	10	2	23	17
Total Recoverable Lead	mg/kg dry wt	10.6	3.9	3.7	17.2	92
Total Recoverable Nickel	mg/kg dry wt	20	10	< 2	14	9
Total Recoverable Zinc	mg/kg dry wt	123	42	5	64	76
Polycyclic Aromatic Hydrocarbons Screening in Soil*						
Total of Reported PAHs in Soil	mg/kg dry wt	-	-	-	-	45
1-Methylnaphthalene	mg/kg dry wt	-	-	-	-	0.020
2-Methylnaphthalene	mg/kg dry wt	-	-	-	-	< 0.013
Acenaphthylene	mg/kg dry wt	-	-	-	-	0.54
Acenaphthene	mg/kg dry wt	-	-	-	-	0.057
Anthracene	mg/kg dry wt	-	-	-	-	1.13
Benzo[a]anthracene	mg/kg dry wt	-	-	-	-	3.0
Benzo[a]pyrene (BAP)	mg/kg dry wt	-	-	-	-	3.4
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	mg/kg dry wt	-	-	-	-	4.9
Benzo[a]pyrene Toxic Equivalence (TEF)*	mg/kg dry wt	-	-	-	-	4.9
Benzo[b]fluoranthene + Benzo[j] fluoranthene	mg/kg dry wt	-	-	-	-	3.5
Benzo[e]pyrene	mg/kg dry wt	-	-	-	-	1.80
Benzo[g,h,i]perylene	mg/kg dry wt	-	-	-	-	2.3
Benzo[k]fluoranthene	mg/kg dry wt	-	-	-	-	1.27
Chrysene	mg/kg dry wt	-	-	-	-	2.5
Dibenzo[a,h]anthracene	mg/kg dry wt	-	-	-	-	0.42
Fluoranthene	mg/kg dry wt	-	-	-	-	7.8
Fluorene	mg/kg dry wt	-	-	-	-	0.42
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	-	-	-	-	2.2
Naphthalene	mg/kg dry wt	-	-	-	-	< 0.07
Perylene	mg/kg dry wt	-	-	-	-	0.81
Phenanthrene	mg/kg dry wt	-	-	-	-	6.2
Pyrene	mg/kg dry wt	-	-	-	-	7.8



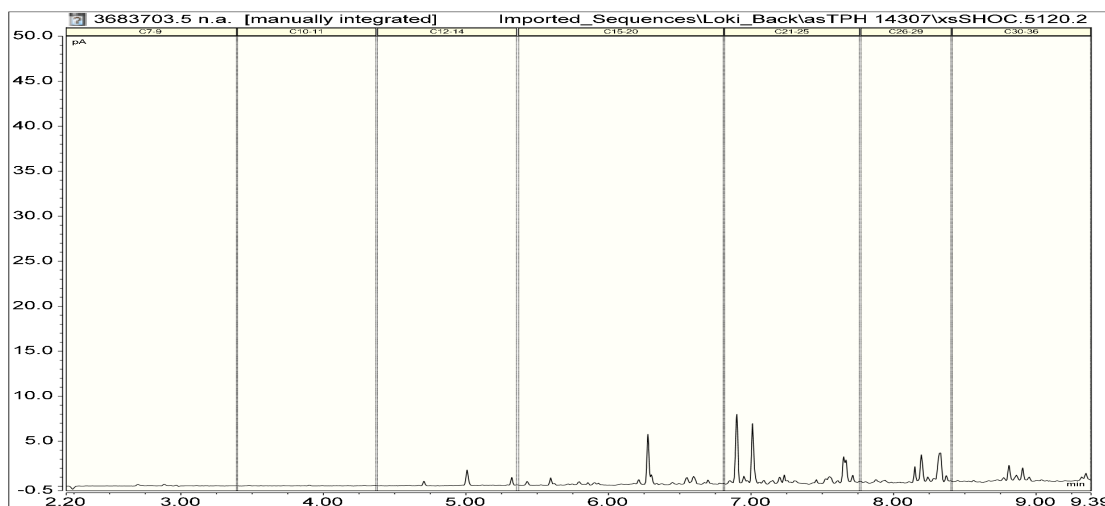
This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported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

Sample Type: Soil						
Sample Name:		BH36_5.45 12-Sep-2024	BH14_10.0-10.1 30-Sep-2024	BH14_2.5-2.6 30-Sep-2024	BH43_2.3 25-Sep-2024	BH43_0.5-0.6 24-Sep-2024
Lab Number:		3683703.1	3683703.2	3683703.3	3683703.4	3683703.5
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	-	< 20
C10 - C14	mg/kg dry wt	-	-	-	-	< 20
C15 - C36	mg/kg dry wt	-	-	-	-	177
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	-	179

3683703.5

BH43_0.5-0.6 24-Sep-2024

Client Chromatogram for TPH by FID



Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-5
Total of Reported PAHs in Soil	Sonication extraction, GC-MS/MS analysis. In-house based on US EPA 8270.	0.03 mg/kg dry wt	5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	5
Benzo[a]pyrene Potency Equivalency Factor (PEF) NES*	BaP Potency Equivalence calculated from; Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(j)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Benzo(a)pyrene x 1.0 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Fluoranthene x 0.01 + Indeno(1,2,3-c,d)pyrene x 0.1. Ministry for the Environment. 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.	0.024 mg/kg dry wt	5
Benzo[a]pyrene Toxic Equivalence (TEF)*	Benzo[a]pyrene Toxic Equivalence (TEF) calculated from; Benzo[a]pyrene x 1.0 + Benzo(a)anthracene x 0.1 + Benzo(b)fluoranthene x 0.1 + Benzo(k)fluoranthene x 0.1 + Chrysene x 0.01 + Dibenzo(a,h)anthracene x 1.0 + Indeno(1,2,3-c,d)pyrene x 0.1. Guidelines for assessing and managing contaminated gasworks sites in New Zealand (GMG) (MfE, 1997).	0.024 mg/kg dry wt	5
TPH Oil Industry Profile + PAHscreen	Sonication extraction, GC-FID and GC-MS/MS analysis. Tested on as received sample. In-house based on US EPA 8015 and US EPA 8270.	0.010 - 70 mg/kg dry wt	5

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-5
Total Petroleum Hydrocarbons in Soil			
Client Chromatogram for TPH by FID	Small peaks associated with QC compounds may be visible in chromatograms with low TPH concentrations. QC peaks are as follows: one peak in the C12 - 14 band, the C21 - 25 band and the C30 - 36 band. All QC peaks are corrected for in the reported TPH concentrations.	-	5
C7 - C9	Solvent extraction, GC-FID analysis. In-house based on US EPA 8015.	20 mg/kg dry wt	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	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	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	5

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

Testing was completed between 02-Oct-2024 and 04-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

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Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3684098	SPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	08-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	QAQC_01 29-Aug-2024	QAQC_02 05-Jul-2024	QAQC_03 10-Jul-2024	QAQC_04 26-Aug-2024	QAQC_05
Lab Number:	3684098.1	3684098.2	3684098.3	3684098.4	3684098.5
Heavy Metals, Screen Level					
Total Recoverable Arsenic	mg/kg dry wt	5	2	3	< 2
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	28	15	22	7
Total Recoverable Copper	mg/kg dry wt	30	10	9	3
Total Recoverable Lead	mg/kg dry wt	12.6	20	6.4	12.8
Total Recoverable Nickel	mg/kg dry wt	8	11	4	2
Total Recoverable Zinc	mg/kg dry wt	35	41	16	12

Sample Name:	QAQC_06	QAQC_07	QAQC_08
Lab Number:	3684098.6	3684098.7	3684098.8
Heavy Metals, Screen Level			
Total Recoverable Arsenic	mg/kg dry wt	9	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	9	21
Total Recoverable Copper	mg/kg dry wt	3	20
Total Recoverable Lead	mg/kg dry wt	14.5	9.2
Total Recoverable Nickel	mg/kg dry wt	5	< 2
Total Recoverable Zinc	mg/kg dry wt	6	9

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-8
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-8



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

Testing was completed between 02-Oct-2024 and 08-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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A handwritten signature in purple ink, consisting of a large stylized 'K' followed by the name 'Harrison' in a cursive script.

Kim Harrison MSc
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 1

Client:	Aurecon New Zealand Limited	Lab No:	3694107	SPv1
Contact:	Hannah Sussex	Date Received:	15-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	18-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:		
		Submitted By:	Hannah Sussex	

Sample Type: Soil

Sample Name:		BH38_6.9-7.0 15-Oct-2024
Lab Number:		3694107.1
Heavy Metals, Screen Level		
Total Recoverable Arsenic	mg/kg dry wt	4
Total Recoverable Cadmium	mg/kg dry wt	< 0.10
Total Recoverable Chromium	mg/kg dry wt	18
Total Recoverable Copper	mg/kg dry wt	27
Total Recoverable Lead	mg/kg dry wt	8.1
Total Recoverable Nickel	mg/kg dry wt	18
Total Recoverable Zinc	mg/kg dry wt	64

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1

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

Testing was completed between 16-Oct-2024 and 18-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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Kim Harrison MSc
Client Services Manager - Environmental

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Client:	Aurecon New Zealand Limited	Lab No:	3583099	A2Pv1
Contact:	Tiana Hill	Date Received:	16-May-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	20-May-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 13/05/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH30_0.23m	BH30_0.62m
Lab Number:	3583099.1	3583099.2
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-
Asbestos in ACM as % of Total Sample* % w/w	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample* % w/w	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001
As Received Weight g	612.9	814.1
Dry Weight g	504.4	559.4
Moisture* %	18	31
Sample Fraction >10mm* g dry wt	176.3	< 0.1
Sample Fraction <10mm to >2mm* g dry wt	257.9	460.0
Sample Fraction <2mm* g dry wt	69.7	98.3
<2mm Subsample Weight* g dry wt	69.7	49.3
Weight of Asbestos in ACM (Non-Friable) g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)* g dry wt	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)* g dry wt	< 0.00001	< 0.00001

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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Summary of Methods

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

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

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

Testing was completed on 20-May-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

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Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3621286	A2Pv1
Contact:	Tiana Hill	Date Received:	05-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	11-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 04/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH29_0.05-0.2	BH48_0.05-0.2	BH10_0.4-0.5	BH10_1.0-1.1
Lab Number:	3621286.1	3621286.2	3621286.4	3621286.5
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-
Asbestos in ACM as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample* % w/w	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight g	723.2	804.6	624.3	1,025.4
Dry Weight g	540.1	626.6	503.2	714.1
Moisture* %	25	22	19	30
Sample Fraction >10mm* g dry wt	55.6	94.9	48.1	122.7
Sample Fraction <10mm to >2mm* g dry wt	313.6	399.6	352.9	408.5
Sample Fraction <2mm* g dry wt	170.6	131.6	101.8	182.2
<2mm Subsample Weight* g dry wt	51.5	54.7	53.7	52.9
Weight of Asbestos in ACM (Non-Friable) g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)* g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)* g dry wt	< 0.00001	< 0.00001	< 0.00001	< 0.00001

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2, 4-5
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-2, 4-5
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-2, 4-5
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
Sample Fraction <10mm to >2mm*	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-2, 4-5
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-2, 4-5
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-2, 4-5
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 4-5
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 4-5
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-2, 4-5
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 4-5
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-2, 4-5

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

Testing was completed on 11-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Mahaleel (May) Alfante BSc, PGDipSci
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3624326	A2Pv1
Contact:	Tiana Hill	Date Received:	10-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	12-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 8/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Building Material

Sample Name	Lab Number	Sample Category	Sample Weight on receipt (g)	Asbestos Presence / Absence	Description of Asbestos in Non Homogeneous Samples
BH49_B1 0.35m / BH49	3624326.1	Fibre Board	10.61	Amosite (Brown Asbestos) detected. Chrysotile (White Asbestos) detected.	N/A

Glossary of Terms

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

For further details, please contact the Asbestos Team.

Summary of Methods

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

Sample Type: Building Material

Test	Method Description	Default Detection Limit	Sample No
Asbestos in Bulk Material			
Sample Category	Assessment of sample type. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	-	1
Sample Weight on receipt	Sample weight (approximate). Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.01 g	1
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1
Description of Asbestos in Non Homogeneous Samples	Form, dimensions and/or weight of asbestos fibres present. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	-	1



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

Testing was completed between 11-Jul-2024 and 12-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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A handwritten signature in blue ink, appearing to read 'Alexa B.', with a stylized flourish at the end.

Alexa Badenhorst BSc (Hons)
Team Leader - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3624327	A2Pv1
Contact:	Tiana Hill	Date Received:	10-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	12-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 8/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH49_0.05-0.2	BH49_0.3-0.4
Lab Number:	3624327.1	3624327.2
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	< 0.001
As Received Weight	g 721.0	818.1
Dry Weight	g 501.6	642.7
Moisture*	% 30	21
Sample Fraction >10mm*	g dry wt 66.4	195.1
Sample Fraction <10mm to >2mm*	g dry wt 357.6	372.9
Sample Fraction <2mm*	g dry wt 77.3	74.1
<2mm Subsample Weight*	g dry wt 54.1	52.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	< 0.00001

Glossary of Terms

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 - Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
 - ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
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 - Trace - Trace levels of asbestos, as defined by AS4964-2004.
- For further details, please contact the Asbestos Team.

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

The following assumptions have been made:

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

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



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

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

Testing was completed on 12-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3626399	A2Pv1
Contact:	Tiana Hill	Date Received:	12-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	16-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 10/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH13_0.4-0.5
Lab Number:	3626399.2
Asbestos Presence / Absence	Asbestos NOT detected.
Description of Asbestos Form	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001
As Received Weight	g 686.2
Dry Weight	g 524.2
Moisture*	% 24
Sample Fraction >10mm*	g dry wt 76.1
Sample Fraction <10mm to >2mm*	g dry wt 314.1
Sample Fraction <2mm*	g dry wt 133.6
<2mm Subsample Weight*	g dry wt 53.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001

Glossary of Terms

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- For further details, please contact the Asbestos Team.

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<https://www.branz.co.nz/asbestos>

The following assumptions have been made:

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

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



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

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

Testing was completed on 16-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Alexa Badenhorst BSc (Hons)
Team Leader - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3629428	A2Pv1
Contact:	Tiana Hill	Date Received:	17-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	19-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290 - 064	
		Add. Client Ref:	Sampled: 16/07/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH39_0.5-0.6
Lab Number:	3629428.1
Asbestos Presence / Absence	Asbestos NOT detected.
Description of Asbestos Form	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001
As Received Weight	g 691.0
Dry Weight	g 530.2
Moisture*	% 23
Sample Fraction >10mm*	g dry wt 133.7
Sample Fraction <10mm to >2mm*	g dry wt 306.7
Sample Fraction <2mm*	g dry wt 88.3
<2mm Subsample Weight*	g dry wt 50.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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Summary of Methods

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

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

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

Testing was completed on 19-Jul-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3651494	A2Pv1
Contact:	Tiana Hill	Date Received:	16-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	19-Aug-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 14-15/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH44_0.3-0.4	BH44_1.1-1.2	BH44_3.0-3.4	BH51_0.5-0.6
Lab Number:	3651494.1	3651494.2	3651494.3	3651494.4
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-	-
Asbestos in ACM as % of Total Sample*	< 0.001	< 0.001	< 0.001	< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	< 0.001	< 0.001	< 0.001	< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	< 0.001	< 0.001	< 0.001	< 0.001
As Received Weight	g	541.7	841.7	746.1
Dry Weight	g	429.7	557.1	589.5
Moisture*	%	21	34	21
Sample Fraction >10mm*	g dry wt	38.4	234.5	317.5
Sample Fraction <10mm to >2mm*	g dry wt	311.2	261.9	194.1
Sample Fraction <2mm*	g dry wt	79.4	58.9	76.0
<2mm Subsample Weight*	g dry wt	52.4	58.9	50.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	< 0.00001

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
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 - Unknown Mineral Fibres - Mineral fibres of unknown type detected by polarised light microscopy including dispersion staining. The fibres detected may or may not be asbestos fibres. To confirm the identities, another independent analytical technique may be required.
 - Trace - Trace levels of asbestos, as defined by AS4964-2004.
- For further details, please contact the Asbestos Team.

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

The following assumptions have been made:

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

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



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Summary of Methods

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Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-4
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-4
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-4
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
Sample Fraction <10mm to >2mm*	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-4
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-4
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-4
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-4
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-4
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-4
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-4
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-4

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

Testing was completed on 19-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3655467	A2Pv1
Contact:	Andrew Allcock	Date Received:	22-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	23-Aug-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290 - 064	
		Add. Client Ref:	Sampled: 19/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH46_0.4-0.5	BH46_1.4-1.6	BH45_0.8-1.0
Lab Number:	3655467.1	3655467.2	3655467.3
Asbestos Presence / Absence	Asbestos NOT detected.	Asbestos NOT detected.	Asbestos NOT detected.
Description of Asbestos Form	-	-	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001	% w/w < 0.001	% w/w < 0.001
As Received Weight	g 713.0	g 686.9	g 787.4
Dry Weight	g 563.1	g 541.3	g 605.0
Moisture*	% 21	% 21	% 23
Sample Fraction >10mm*	g dry wt 270.6	g dry wt 242.2	g dry wt 260.4
Sample Fraction <10mm to >2mm*	g dry wt 233.2	g dry wt 232.0	g dry wt 271.0
Sample Fraction <2mm*	g dry wt 58.9	g dry wt 64.2	g dry wt 72.2
<2mm Subsample Weight*	g dry wt 58.9	g dry wt 51.9	g dry wt 55.8
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001	g dry wt < 0.00001	g dry wt < 0.00001

Glossary of Terms

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Please refer to the **BRANZ New Zealand Guidelines for Assessing and Managing Asbestos in Soil.**
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The following assumptions have been made:

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

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



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Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
New Zealand Guidelines Semi Quantitative Asbestos in Soil			
As Received Weight	Measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-3
Dry Weight	Sample dried at 100 to 105°C, measurement on balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g	1-3
Moisture*	Sample dried at 100 to 105°C. Calculation = (As received weight - Dry weight) / as received weight x 100.	1 %	1-3
Sample Fraction >10mm*	Sample dried at 100 to 105°C, 10mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Sample Fraction <10mm to >2mm*	Sample dried at 100 to 105°C, 10mm and 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Sample Fraction <2mm*	Sample dried at 100 to 105°C, 2mm sieve, measurement on analytical balance. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland.	0.1 g dry wt	1-3
Asbestos Presence / Absence	Examination using Low Powered Stereomicroscopy followed by 'Polarised Light Microscopy' including 'Dispersion Staining Techniques'. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. AS 4964 (2004) - Method for the Qualitative Identification of Asbestos in Bulk Samples.	0.01%	1-3
Description of Asbestos Form	Description of asbestos form and/or shape if present.	-	1-3
Weight of Asbestos in ACM (Non-Friable)	Measurement on analytical balance, from the >10mm Fraction. Weight of asbestos based on assessment of ACM form. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos in ACM as % of Total Sample*	Calculated from weight of asbestos in ACM and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Weight of Asbestos as Fibrous Asbestos (Friable)*	Measurement on analytical balance, from the >10mm Fraction. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Fibrous Asbestos as % of Total Sample*	Calculated from weight of fibrous asbestos and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Weight of Asbestos as Asbestos Fines (Friable)*	Measurement on analytical balance, from the <10mm Fractions. Analysed at Hill Laboratories - Asbestos; 28 Heather Street, Auckland. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.00001 g dry wt	1-3
Asbestos as Asbestos Fines as % of Total Sample*	Calculated from weight of asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	Calculated from weight of fibrous asbestos plus asbestos fines and sample dry weight. New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017.	0.001 % w/w	1-3

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

Testing was completed on 23-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3658961	A2Pv1
Contact:	Tiana Hill	Date Received:	28-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	30-Aug-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Add. Client Ref:	Sampled 26/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH25_0.2-0.3
Lab Number:	3658961.1
Asbestos Presence / Absence	Asbestos NOT detected.
Description of Asbestos Form	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001
As Received Weight	g 629.9
Dry Weight	g 456.6
Moisture*	% 28
Sample Fraction >10mm*	g dry wt 70.8
Sample Fraction <10mm to >2mm*	g dry wt 206.5
Sample Fraction <2mm*	g dry wt 178.7
<2mm Subsample Weight*	g dry wt 52.8
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001

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- For further details, please contact the Asbestos Team.

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The following assumptions have been made:

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

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



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

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

Testing was completed on 30-Aug-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3663691	A2Pv1
Contact:	Tiana Hill	Date Received:	03-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	05-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Add. Client Ref:	Sampled: 29/08/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH06_0.4-0.5
Lab Number:	3663691.1
Asbestos Presence / Absence	Asbestos NOT detected.
Description of Asbestos Form	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001
As Received Weight	g 721.7
Dry Weight	g 559.6
Moisture*	% 22
Sample Fraction >10mm*	g dry wt 191.2
Sample Fraction <10mm to >2mm*	g dry wt 282.4
Sample Fraction <2mm*	g dry wt 83.9
<2mm Subsample Weight*	g dry wt 50.1
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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

Summary of Methods

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

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

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

Testing was completed on 05-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Mahaleel (May) Alfante BSc, PGDipSci
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3670623	A2Pv1
Contact:	Tiana Hill	Date Received:	12-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	16-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil				
Sample Name:		BH36_0.6-0.7 12-Sep-2024	BH46_3.5-3.6 23-Aug-2024	
Lab Number:		3670623.1	3670623.2	
Asbestos Presence / Absence		Asbestos NOT detected.		Asbestos NOT detected.
Description of Asbestos Form		-		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001		< 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001		< 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001		< 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001		< 0.001
As Received Weight	g	827.9		968.0
Dry Weight	g	544.3		742.7
Moisture*	%	34		23
Sample Fraction >10mm*	g dry wt	306.2		464.9
Sample Fraction <10mm to >2mm*	g dry wt	185.7		210.4
Sample Fraction <2mm*	g dry wt	50.6		67.2
<2mm Subsample Weight*	g dry wt	50.6		53.0
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001		< 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001		< 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001		< 0.00001

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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Summary of Methods

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

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

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

Testing was completed on 16-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3674826	A2Pv1
Contact:	Tiana Hill	Date Received:	18-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	19-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-64	
		Submitted By:	Tiana Hill	

Sample Type: Soil				
Sample Name:		BH38_1.1-1.2 18-Sep-2024	BH14_0.6-0.7 16-Sep-2024	
Lab Number:		3674826.1	3674826.2	
Asbestos Presence / Absence		Asbestos NOT detected.		Asbestos NOT detected.
Description of Asbestos Form		-		-
Asbestos in ACM as % of Total Sample*	% w/w	< 0.001	< 0.001	
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w	< 0.001	< 0.001	
Asbestos as Asbestos Fines as % of Total Sample*	% w/w	< 0.001	< 0.001	
As Received Weight	g	1,064.8	883.9	
Dry Weight	g	830.6	645.7	
Moisture*	%	22	27	
Sample Fraction >10mm*	g dry wt	53.1	311.5	
Sample Fraction <10mm to >2mm*	g dry wt	546.0	241.3	
Sample Fraction <2mm*	g dry wt	223.0	86.0	
<2mm Subsample Weight*	g dry wt	46.5	55.6	
Weight of Asbestos in ACM (Non-Friable)	g dry wt	< 0.00001	< 0.00001	
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt	< 0.00001	< 0.00001	
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt	< 0.00001	< 0.00001	

Glossary of Terms

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

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

The following assumptions have been made:

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

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



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Summary of Methods

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

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

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

Testing was completed on 19-Sep-2024. For completion dates of individual analyses please contact the laboratory.

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

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Danielle Carter BSc, PGDipSci, MSc
Laboratory Technician - Asbestos

Certificate of Analysis

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Client:	Aurecon New Zealand Limited	Lab No:	3682863	A2Pv1
Contact:	Tiana Hill	Date Received:	30-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	03-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Add. Client Ref:	Sampled 24/09/24	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	BH43_0.5-0.6
Lab Number:	3682863.1
Asbestos Presence / Absence	Asbestos NOT detected.
Description of Asbestos Form	-
Asbestos in ACM as % of Total Sample*	% w/w < 0.001
Combined Fibrous Asbestos + Asbestos Fines as % of Total Sample*	% w/w < 0.001
Asbestos as Fibrous Asbestos as % of Total Sample*	% w/w < 0.001
Asbestos as Asbestos Fines as % of Total Sample*	% w/w < 0.001
As Received Weight	g 738.9
Dry Weight	g 550.9
Moisture*	% 25
Sample Fraction >10mm*	g dry wt 198.1
Sample Fraction <10mm to >2mm*	g dry wt 271.6
Sample Fraction <2mm*	g dry wt 79.6
<2mm Subsample Weight*	g dry wt 51.5
Weight of Asbestos in ACM (Non-Friable)	g dry wt < 0.00001
Weight of Asbestos as Fibrous Asbestos (Friable)*	g dry wt < 0.00001
Weight of Asbestos as Asbestos Fines (Friable)*	g dry wt < 0.00001

Glossary of Terms

- Loose fibres (Minor) - One or two fibres/fibre bundles identified during analysis by stereo microscope/PLM.
 - Loose fibres (Major) - Three or more fibres/fibre bundles identified during analysis by stereo microscope/PLM.
 - ACM Debris (Minor) - One or two small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
 - ACM Debris (Major) - Large (>2mm) piece, or more than three small (<2mm) pieces of material attached to fibres identified during analysis by stereo microscope/PLM.
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 - Trace - Trace levels of asbestos, as defined by AS4964-2004.
- For further details, please contact the Asbestos Team.

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

The following assumptions have been made:

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

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



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Summary of Methods

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

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

Testing was completed between 02-Oct-2024 and 03-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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



Alexa Badenhorst BSc (Hons)
Team Leader - Asbestos

Quality Assurance Report

Page 1 of 6

Client:	Aurecon New Zealand Limited	Lab No:	3684098	QCPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	08-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	$< 4 \pm 2.7$	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	$< 4 \pm 2.7$	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	$< 4 \pm 2.7$	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.29

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.29

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.61

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.32

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11097.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11097.35

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11097.35

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11100.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11100.40

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.37

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.88

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.88

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Reference Material QCs

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.86 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.8 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.2 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.5 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	198 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.47

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.7 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.92 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	30.9 ± 5.0	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.7 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	36.6 ± 5.5	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.7 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	217 ± 16	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.2 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.83 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.0 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.1 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.2 ± 4.9	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	194 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.37

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.3 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.80 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.9 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.4 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	31.4 ± 4.8	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.3 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	196 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.62

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.8 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.77 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.2 ± 4.0	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.1 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	29.7 ± 4.5	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.1 ± 2.2	11.6 – 17.1	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.62

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	180 ± 13	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.5 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.83 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.5 ± 4.2	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.1 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.8 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.7 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	197 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.49

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.5 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.85 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.1 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.8 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.7 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.6 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	199 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11097.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.0 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.79 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.8 ± 4.1	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.4 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.7 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.5 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	197 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11097.55

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.8 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.79 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.1 ± 4.1	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.1 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	31.7 ± 4.8	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.0 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	191 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11100.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.7 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.82 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.1 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.2 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.8 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.2 ± 2.3	11.6 – 17.1	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11100.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	190 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11100.57

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.5 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.6 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	192 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.2 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.88 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.8 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.6 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.8 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.6 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	200 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.51

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.7 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.86 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.2 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.1 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.4 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	197 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11104.89

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.4 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.95 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	29.9 ± 4.9	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	15.0 ± 2.5	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	37.4 ± 5.6	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	16.9 ± 2.6	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	222 ± 16	171 – 230	No

Certificate of Analysis

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3684098	SPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	08-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Type: Soil

Sample Name:	QAQC_01 29-Aug-2024	QAQC_02 05-Jul-2024	QAQC_03 10-Jul-2024	QAQC_04 26-Aug-2024	QAQC_05
Lab Number:	3684098.1	3684098.2	3684098.3	3684098.4	3684098.5
Heavy Metals, Screen Level					
Total Recoverable Arsenic mg/kg dry wt	5	2	3	< 2	< 2
Total Recoverable Cadmium mg/kg dry wt	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium mg/kg dry wt	28	15	22	7	14
Total Recoverable Copper mg/kg dry wt	30	10	9	3	4
Total Recoverable Lead mg/kg dry wt	12.6	20	6.4	12.8	7.4
Total Recoverable Nickel mg/kg dry wt	8	11	4	2	3
Total Recoverable Zinc mg/kg dry wt	35	41	16	12	9

Sample Name:	QAQC_06	QAQC_07	QAQC_08
Lab Number:	3684098.6	3684098.7	3684098.8
Heavy Metals, Screen Level			
Total Recoverable Arsenic mg/kg dry wt	9	4	< 2
Total Recoverable Cadmium mg/kg dry wt	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium mg/kg dry wt	9	21	27
Total Recoverable Copper mg/kg dry wt	3	20	21
Total Recoverable Lead mg/kg dry wt	14.5	9.2	13.6
Total Recoverable Nickel mg/kg dry wt	5	< 2	13
Total Recoverable Zinc mg/kg dry wt	6	9	55

Summary of Methods

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

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed).	-	1-8
Heavy Metals, Screen Level	Dried sample, < 2mm fraction. Nitric/Hydrochloric acid digestion US EPA 200.2. Complies with NES Regulations. ICP-MS screen level, interference removal by Kinetic Energy Discrimination if required.	0.10 - 4 mg/kg dry wt	1-8



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

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

Testing was completed between 02-Oct-2024 and 08-Oct-2024. For completion dates of individual analyses please contact the laboratory.

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

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

A handwritten signature in purple ink, consisting of a large stylized 'K' followed by the name 'Harrison' in a cursive script.

Kim Harrison MSc
Client Services Manager - Environmental

Attachment I – QA/QC records

Quality Assurance Report

Page 1 of 5

Client:	Aurecon New Zealand Limited	Lab No:	3582989	QCPv1
Contact:	Tiana Hill	Date Received:	16-May-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	20-May-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Organochlorine Pesticides Screening in Soil

		3582989.1	Control Limits	Outside Limit (Yes/No)
2,4,5,6-tetrachloro-m-xylene	%	109	40 – 120	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3582989.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	112	65 – 130	No
Benzo[a]pyrene-d12	%	116	70 – 140	No
Fluoranthene-d10	%	104	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3582989.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	111	65 – 130	No
Benzo[a]pyrene-d12	%	116	70 – 140	No
Fluoranthene-d10	%	104	66 – 130	No

Blank QCs

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 15857.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	0.011 ± 0.032	0.0 – 0.0100	Yes #1
2-Methylnaphthalene	mg/kg dry wt	< 0.02 ± 0.032	0.0 – 0.0100	Yes #2
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 15857.1

		Results	Control Limits	Outside Limit (Yes/No)
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.26

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Organochlorine Pesticides Soil Analysis: 8101.1

		Results	Control Limits	Outside Limit (Yes/No)
Aldrin	mg/kg dry wt	< 0.010 ± 0.0030	0.0 – 0.0100	No
alpha-BHC	mg/kg dry wt	< 0.010 ± 0.0030	0.0 – 0.0100	No
beta-BHC	mg/kg dry wt	< 0.010 ± 0.0028	0.0 – 0.0100	No
delta-BHC	mg/kg dry wt	< 0.010 ± 0.0029	0.0 – 0.0100	No
gamma-BHC (Lindane)	mg/kg dry wt	< 0.010 ± 0.0031	0.0 – 0.0100	No
cis-Chlordane	mg/kg dry wt	< 0.010 ± 0.0030	0.0 – 0.0100	No
trans-Chlordane	mg/kg dry wt	< 0.010 ± 0.0030	0.0 – 0.0100	No
2,4'-DDD	mg/kg dry wt	< 0.010 ± 0.0029	0.0 – 0.0100	No
4,4'-DDD	mg/kg dry wt	< 0.010 ± 0.0024	0.0 – 0.0100	No
2,4'-DDE	mg/kg dry wt	< 0.010 ± 0.0030	0.0 – 0.0100	No
4,4'-DDE	mg/kg dry wt	< 0.010 ± 0.0023	0.0 – 0.0100	No
2,4'-DDT	mg/kg dry wt	< 0.010 ± 0.0021	0.0 – 0.0100	No
4,4'-DDT	mg/kg dry wt	< 0.010 ± 0.0017	0.0 – 0.0100	No
Dieldrin	mg/kg dry wt	< 0.010 ± 0.0026	0.0 – 0.0100	No
Endosulfan I	mg/kg dry wt	< 0.010 ± 0.0029	0.0 – 0.0100	No
Endosulfan II	mg/kg dry wt	< 0.010 ± 0.0026	0.0 – 0.0100	No
Endosulfan sulphate	mg/kg dry wt	< 0.010 ± 0.0013	0.0 – 0.0100	No
Endrin	mg/kg dry wt	< 0.010 ± 0.00048	0.0 – 0.0100	No
Endrin aldehyde	mg/kg dry wt	< 0.010 ± 0.0019	0.0 – 0.0100	No
Endrin ketone	mg/kg dry wt	< 0.010 ± 0.0024	0.0 – 0.0100	No
Heptachlor	mg/kg dry wt	< 0.010 ± 0.0029	0.0 – 0.0100	No
Heptachlor epoxide	mg/kg dry wt	< 0.010 ± 0.0031	0.0 – 0.0100	No
Hexachlorobenzene	mg/kg dry wt	< 0.010 ± 0.0029	0.0 – 0.0100	No
Methoxychlor	mg/kg dry wt	< 0.010 ± 0.00048	0.0 – 0.0100	No

QC Spike QCs

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 15857.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	121 ± 30	78 – 122	No
2-Methylnaphthalene	%	117 ± 29	72 – 117	No
Acenaphthylene	%	111 ± 10	75 – 118	No
Acenaphthene	%	115 ± 33	84 – 119	No
Anthracene	%	114 ± 35	79 – 121	No
Benzo[a]anthracene	%	114 ± 30	81 – 123	No
Benzo[a]pyrene (BAP)	%	113.0 ± 8.6	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	113 ± 24	80 – 121	No
Benzo[e]pyrene	%	97.0 ± 7.4	78 – 110	No
Benzo[g,h,i]perylene	%	112 ± 20	80 – 124	No
Benzo[k]fluoranthene	%	111 ± 14	79 – 121	No
Chrysene	%	108 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	110 ± 15	78 – 124	No
Fluoranthene	%	101 ± 11	81 – 122	No
Fluorene	%	111 ± 14	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	109 ± 11	83 – 123	No
Naphthalene	%	120 ± 30	84 – 118	Yes #3
Perylene	%	98.0 ± 7.5	76 – 107	No
Phenanthrene	%	110 ± 16	84 – 120	No
Pyrene	%	113 ± 15	79 – 123	No

LCS OC/PAH PrepWS xsSHOC - WS: Organochlorine Pesticides Soil Analysis: 8101.2

		Results	Control Limits	Outside Limit (Yes/No)
Aldrin	%	104 ± 32	80 – 121	No
alpha-BHC	%	101 ± 31	76 – 121	No
beta-BHC	%	98 ± 38	75 – 113	No
delta-BHC	%	100 ± 35	74 – 114	No
gamma-BHC (Lindane)	%	100 ± 29	78 – 116	No
cis-Chlordane	%	103 ± 33	78 – 118	No
trans-Chlordane	%	106 ± 32	76 – 121	No
2,4'-DDD	%	96 ± 35	75 – 114	No
4,4'-DDD	%	94 ± 46	75 – 120	No
2,4'-DDE	%	108 ± 35	73 – 118	No
4,4'-DDE	%	101 ± 51	73 – 116	No
2,4'-DDT	%	134 ± 70	70 – 124	Yes #4
4,4'-DDT	%	136 ± 79	65 – 120	Yes #4
Dieldrin	%	109 ± 48	84 – 124	No
Endosulfan I	%	106 ± 39	81 – 120	No
Endosulfan II	%	96 ± 43	72 – 117	No
Endosulfan sulphate	%	102 ± 64	76 – 120	No
Endrin	%	106 ± 70	78 – 124	No
Endrin aldehyde	%	116 ± 65	84 – 127	No
Endrin ketone	%	96 ± 47	69 – 115	No
Heptachlor	%	102 ± 35	74 – 120	No
Heptachlor epoxide	%	100 ± 29	79 – 119	No

LCS OC/PAH PrepWS xsSHOC - WS: Organochlorine Pesticides Soil Analysis: 8101.2				
		Results	Control Limits	Outside Limit (Yes/No)
Hexachlorobenzene	%	98 ± 34	77 – 116	No
Methoxychlor	%	127 ± 84	70 – 125	Yes #4

Sample Spike QCs

Spike OC/PAH PrepWS xsSHOC - WS: Organochlorine Pesticides Soil Analysis: 8101.16

		Results	Control Limits	Outside Limit (Yes/No)
Aldrin	%	107 ± 33	83 – 122	No
alpha-BHC	%	106 ± 32	80 – 122	No
beta-BHC	%	102 ± 39	79 – 114	No
delta-BHC	%	101 ± 35	76 – 118	No
gamma-BHC (Lindane)	%	103 ± 29	80 – 117	No
cis-Chlordane	%	105 ± 34	80 – 120	No
trans-Chlordane	%	109 ± 33	79 – 121	No
2,4'-DDD	%	106 ± 39	74 – 120	No
4,4'-DDD	%	105 ± 51	75 – 125	No
2,4'-DDE	%	109 ± 35	74 – 119	No
4,4'-DDE	%	104 ± 53	76 – 120	No
2,4'-DDT	%	112 ± 59	72 – 126	No
4,4'-DDT	%	101 ± 59	63 – 123	No
Dieldrin	%	113 ± 50	86 – 126	No
Endosulfan I	%	107 ± 39	83 – 120	No
Endosulfan II	%	99 ± 44	72 – 119	No
Endosulfan sulphate	%	108 ± 67	78 – 124	No
Endrin	%	110 ± 73	82 – 126	No
Endrin aldehyde	%	118 ± 67	84 – 131	No
Endrin ketone	%	98 ± 48	70 – 119	No
Heptachlor	%	94 ± 32	79 – 123	No
Heptachlor epoxide	%	105 ± 30	81 – 119	No
Hexachlorobenzene	%	103 ± 36	77 – 119	No
Methoxychlor	%	108 ± 72	71 – 133	No

Reference Material QCs

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	14.9 ± 2.3	10.0 – 14.8	Yes #5

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	8.7 ± 1.9	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.371 ± 0.083	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.8 ± 4.0	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.7 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	41.4 ± 6.2	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.8 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	88.3 ± 6.8	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.34

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	13.0 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.43

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	8.5 ± 1.9	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.363 ± 0.083	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	21.0 ± 3.5	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.2 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	40.1 ± 6.1	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.8 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	84.7 ± 6.6	79 – 105	No

AGAL-12 QC PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10404.54

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	3.4 ± 1.4	3.1 – 4.2	No
Total Recoverable Cadmium	mg/kg dry wt	0.70 ± 0.12	0.66 – 0.88	No
Total Recoverable Chromium	mg/kg dry wt	31.5 ± 5.1	27 – 35	No
Total Recoverable Copper	mg/kg dry wt	146 ± 20	140 – 168	No
Total Recoverable Lead	mg/kg dry wt	30.5 ± 4.6	29 – 36	No
Total Recoverable Nickel	mg/kg dry wt	15.2 ± 2.4	13.3 – 17.3	No
Total Recoverable Zinc	mg/kg dry wt	176 ± 13	165 – 200	No

Analyst's Comments

#1 The corresponding data was accepted as the blank level is at the Method Detection Limit (MDL).

#2 The detection limit for 2-Methylnaphthalene was raised due to an elevated blank level found during the analysis.

#3 It was noted that the Laboratory Control Spike (LCS) recovery was elevated and above the acceptable recovery range. The corresponding sample results were accepted because the sample spike recovery was within the expected range.

#4 The Laboratory Control Sample (LCS) spike recovery was elevated and above the acceptable recovery range. The corresponding sample results were accepted as there were no positives detected in the sample.

#5 The recovery for this analyte was outside the acceptable recovery range of the method. The corresponding sample result was accepted because the related recovery in the other QC material analysed was within the expected range.

Quality Assurance Report

Page 1 of 2

Client:	Aurecon New Zealand Limited	Lab No:	3590857	QCPv1
Contact:	Tiana Hill	Date Received:	24-May-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	28-May-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	$< 4 \pm 2.7$	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.40

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	$< 0.10 \pm 0.066$	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	$< 2 \pm 1.3$	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	$< 0.4 \pm 0.26$	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	$< 2 \pm 1.4$	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	$< 4 \pm 2.7$	-4.0 – 4.0	No

Reference Material QCs

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.0 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	13.4 ± 2.1	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.7 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.402 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	26.2 ± 4.3	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.6 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	42.1 ± 6.3	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.4 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	90.1 ± 6.9	79 – 105	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.1 ± 1.9	8.0 – 11.0	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Cadmium	mg/kg dry wt	0.383 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.9 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.8 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	40.0 ± 6.0	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.0 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	89.5 ± 6.9	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.52

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.5 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.6 ± 1.9	10.0 – 14.8	No

AGAL-12 QC PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10445.62

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	3.8 ± 1.5	3.1 – 4.2	No
Total Recoverable Cadmium	mg/kg dry wt	0.77 ± 0.13	0.66 – 0.88	No
Total Recoverable Chromium	mg/kg dry wt	34.2 ± 5.5	27 – 35	No
Total Recoverable Copper	mg/kg dry wt	156 ± 22	140 – 168	No
Total Recoverable Lead	mg/kg dry wt	33.4 ± 5.1	29 – 36	No
Total Recoverable Nickel	mg/kg dry wt	16.8 ± 2.6	13.3 – 17.3	No
Total Recoverable Zinc	mg/kg dry wt	189 ± 14	165 – 200	No

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3610977	QCPv1
Contact:	Tiana Hill	Date Received:	20-Jun-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	27-Jun-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Blank QCs

FBlank PrepWS DissPrep 1 - WS: Environmental Waters by ICP-MS (EW): 21004.22

		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m ³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m ³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m ³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Zinc	g/m ³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

FBlank PrepWS DissPrep 2 - WS: Environmental Waters by ICP-MS (EW): 21004.23

		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m ³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m ³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m ³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m ³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Zinc	g/m ³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

20x Dilution FBlank PrepWS DissPrep - WS: Environmental Waters by ICP-MS (EW): 21004.24

		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m ³	< 0.02 ± 0.00067	-0.020 – 0.020	No
Dissolved Cadmium	g/m ³	< 0.0010 ± 0.000034	-0.00100 – 0.00100	No
Dissolved Chromium	g/m ³	< 0.010 ± 0.00035	-0.0100 – 0.0100	No
Dissolved Copper	g/m ³	< 0.010 ± 0.00034	-0.0100 – 0.0100	No
Dissolved Lead	g/m ³	< 0.002 ± 0.000067	-0.0020 – 0.0020	No
Dissolved Nickel	g/m ³	< 0.010 ± 0.00034	-0.0100 – 0.0100	No
Dissolved Zinc	g/m ³	< 0.02 ± 0.00067	-0.020 – 0.020	No

Blank 1 - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.9

		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	g/m ³	< 0.00008 ± 0.00053	-0.000075 – 0.000075	No

Blank 2 - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.10

		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	g/m ³	< 0.00008 ± 0.00053	-0.000075 – 0.000075	No

FBlank PrepWS DissPrepMisc 1 - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.41			
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		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	g/m ³	< 0.00008 ± 0.00053	-0.000075 – 0.000075	No

FBlank PrepWS DissPrepMisc 2 - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.42			
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		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	g/m ³	< 0.00008 ± 0.00053	-0.000075 – 0.000075	No

QC Spike QCs			
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Blank Spike - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.61			
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		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	%	102 ± 13	85 – 115	No

Sample Spike QCs			
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Spike - WS: Hg by Cold Vapour / Atomic Fluorescence (HgBrF): 3372.35			
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		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Mercury	%	105 ± 13	80 – 120	No

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3620390	QCPv2
Contact:	Tiana Hill	Date Received:	04-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	14-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Sample Specific QCs

BTEX in Soil by Headspace GC-MS

		3620390.4	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	102	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3620390.4	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	100	65 – 130	No
Benzo[a]pyrene-d12	%	104	70 – 140	No
Fluoranthene-d10	%	95	66 – 130	No

BTEX in Soil by Headspace GC-MS

		3620390.5	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	115	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3620390.5	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	96	65 – 130	No
Benzo[a]pyrene-d12	%	94	70 – 140	No
Fluoranthene-d10	%	97	66 – 130	No

Blank QCs

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16045.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16045.1

		Results	Control Limits	Outside Limit (Yes/No)
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

blank PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6463.2

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	mg/kg dry wt	< 0.05 ± 0.024	0.0 – 0.033	No
Toluene	mg/kg dry wt	< 0.05 ± 0.023	0.0 – 0.033	No
Ethylbenzene	mg/kg dry wt	< 0.05 ± 0.014	0.0 – 0.033	No
m&p-Xylene	mg/kg dry wt	< 0.10 ± 0.037	0.0 – 0.067	No
o-Xylene	mg/kg dry wt	< 0.05 ± 0.026	0.0 – 0.033	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.36

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16047.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16047.1

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16047.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.10 ± 0.033	0.0 – 0.0100	Yes
2-Methylnaphthalene	mg/kg dry wt	< 0.10 ± 0.036	0.0 – 0.0100	Yes
Acenaphthylene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.10 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.10 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.10 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.10 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.10 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.5 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.10 ± 0.0077	0.0 – 0.0100	Yes
Pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.32

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.76

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.53

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.61

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Fluid 2 Blank (glass) - WS: TCLP - Toxicity Characteristic Leaching Procedure: 5052.7

		Results	Control Limits	Outside Limit (Yes/No)
TCLP Weight of Sample Taken	g	2,000	Undefined	N/A #1
TCLP Extraction Fluid pH	pH Units	2.9 ± 0.1	Undefined	N/A #1
TCLP Post Extraction Sample pH	pH Units	2.9 ± 0.1	Undefined	N/A #1

Fluid 1 Blank (plastic) - WS: TCLP - Toxicity Characteristic Leaching Procedure: 5052.8

		Results	Control Limits	Outside Limit (Yes/No)
TCLP Weight of Sample Taken	g	1,000	Undefined	N/A #1
TCLP Extraction Fluid pH	pH Units	5.0 ± 0.1	Undefined	N/A #1
TCLP Post Extraction Sample pH	pH Units	5.0 ± 0.1	Undefined	N/A #1

20x Dilution Fluid 1 Blank (plastic) PrepWS TCLP PrepWS ExtnDig - WS: Env. Waters Totals by ICP-MS (EWT): 21177.60			
	Results	Control Limits	Outside Limit (Yes/No)
Total Lead g/m ³	< 0.0021 ± 0.0014	-0.0021 – 0.0021	No

20x Dilution Fluid 1 Blank (glass) PrepWS TCLP PrepWS ExtnDig - WS: Env. Waters Totals by ICP-MS (EWT): 21177.61			
	Results	Control Limits	Outside Limit (Yes/No)
Total Lead g/m ³	< 0.0021 ± 0.0014	-0.0021 – 0.0021	No

20x Dilution Fluid 1 Blank (plastic) PrepWS TCLP PrepWS ExtnDig - WS: Env. Waters Totals by ICP-MS (EWT): 21177.62			
	Results	Control Limits	Outside Limit (Yes/No)
Total Lead g/m ³	< 0.0021 ± 0.0014	-0.0021 – 0.0021	No

QC Spike QCs

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16045.2

	Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene %	101 ± 25	78 – 122	No
2-Methylnaphthalene %	95 ± 24	72 – 117	No
Acenaphthylene %	98.0 ± 8.9	75 – 118	No
Acenaphthene %	101 ± 29	84 – 119	No
Anthracene %	100 ± 31	79 – 121	No
Benzo[a]anthracene %	98 ± 26	81 – 123	No
Benzo[a]pyrene (BAP) %	103.0 ± 7.9	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene %	96 ± 20	80 – 121	No
Benzo[e]pyrene %	86.0 ± 6.6	78 – 110	No
Benzo[g,h,i]perylene %	99 ± 18	80 – 124	No
Benzo[k]fluoranthene %	99 ± 13	79 – 121	No
Chrysene %	99 ± 15	83 – 121	No
Dibenzo[a,h]anthracene %	101 ± 13	78 – 124	No
Fluoranthene %	101 ± 11	81 – 122	No
Fluorene %	101 ± 12	86 – 122	No
Indeno(1,2,3-c,d)pyrene %	96.0 ± 8.9	83 – 123	No
Naphthalene %	100 ± 25	84 – 118	No
Perylene %	87.0 ± 6.7	76 – 107	No
Phenanthrene %	98 ± 14	84 – 120	No
Pyrene %	93 ± 12	79 – 123	No

LCS PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6463.3

	Results	Control Limits	Outside Limit (Yes/No)
Benzene %	103.0 ± 9.5	87 – 111	No
Toluene %	101.0 ± 7.5	89 – 110	No
Ethylbenzene %	98.0 ± 7.5	95 – 113	No
m&p-Xylene %	98.0 ± 8.7	87 – 114	No
o-Xylene %	100.0 ± 7.9	88 – 114	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14101.3

	Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36) %	95 ± 44	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16047.3

	Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene %	101 ± 25	78 – 122	No
2-Methylnaphthalene %	97 ± 24	72 – 117	No
Acenaphthylene %	106.0 ± 9.6	75 – 118	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16047.3

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene	%	107 ± 31	84 – 119	No
Anthracene	%	102 ± 31	79 – 121	No
Benzo[a]anthracene	%	96 ± 25	81 – 123	No
Benzo[a]pyrene (BAP)	%	105.0 ± 8.0	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	103 ± 22	80 – 121	No
Benzo[e]pyrene	%	92.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	108 ± 19	80 – 124	No
Benzo[k]fluoranthene	%	100 ± 13	79 – 121	No
Chrysene	%	98 ± 15	83 – 121	No
Dibenzo[a,h]anthracene	%	109 ± 14	78 – 124	No
Fluoranthene	%	100 ± 11	81 – 122	No
Fluorene	%	107 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	108 ± 10	83 – 123	No
Naphthalene	%	104 ± 26	84 – 118	No
Perylene	%	95.0 ± 7.3	76 – 107	No
Phenanthrene	%	103 ± 15	84 – 120	No
Pyrene	%	107 ± 14	79 – 123	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14106.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	100 ± 44	70 – 130	No

Sample Spike QCs
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14101.24

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	85 ± 43	70 – 130	No

TCLP Spike PrepWS ExtndDig - WS: Env. Waters Totals by ICP-MS (EWT): 21177.82

		Results	Control Limits	Outside Limit (Yes/No)
Total Lead	%	103.0 ± 6.2	80 – 120	No

Reference Material QCs
QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	17.6 ± 3.0	9.4 – 13.9	Yes #2

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.1 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.396 ± 0.085	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.9 ± 4.3	15.5 – 27	No
Total Recoverable Nickel	mg/kg dry wt	6.4 ± 1.6	4.6 – 7.0	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.55

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	13.5 ± 2.4	9.4 – 13.9	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.74

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.421 ± 0.088	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	26.9 ± 4.4	15.5 – 27	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10665.74

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	6.6 ± 1.6	4.6 – 7.0	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	13.3 ± 2.4	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	17.5 ± 2.7	10.0 – 14.8	Yes #2

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.2 ± 2.1	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.390 ± 0.085	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.4 ± 4.2	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.4 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	48.7 ± 7.3	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.2 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	100.6 ± 7.6	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.38

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	13.5 ± 2.4	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	13.7 ± 2.1	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10667.47

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.1 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.403 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.2 ± 4.2	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.6 ± 3.3	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	48.5 ± 7.3	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.4 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	100.6 ± 7.6	79 – 105	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	13.5 ± 2.4	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	14.4 ± 2.2	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.4 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.417 ± 0.087	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.0 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.1 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	62.8 ± 9.4	39 – 51	Yes #2
Total Recoverable Nickel	mg/kg dry wt	6.3 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	94.8 ± 7.2	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.41

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	13.2 ± 2.4	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	15.8 ± 2.4	10.0 – 14.8	Yes #2

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.52				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.0 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.445 ± 0.090	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.1 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.8 ± 3.3	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	47.8 ± 7.2	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.0 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	99.3 ± 7.5	79 – 105	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.77				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.6 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.9 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10668.79				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.1 ± 1.9	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.374 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.5 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.8 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	56.1 ± 8.4	39 – 51	Yes #2
Total Recoverable Nickel	mg/kg dry wt	5.9 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	90.5 ± 6.9	79 – 105	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.54				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	13.9 ± 2.1	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.56				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Copper	mg/kg dry wt	19.2 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	45.1 ± 6.8	39 – 51	No
Total Recoverable Zinc	mg/kg dry wt	91.2 ± 7.0	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.65				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	13.7 ± 2.1	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10670.70				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Copper	mg/kg dry wt	21.1 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	49.8 ± 7.5	39 – 51	No
Total Recoverable Zinc	mg/kg dry wt	98.8 ± 7.5	79 – 105	No

1% 50ppb TRDig and TDig ME QC PrepWS ExtnDig - WS: Env. Waters Totals by ICP-MS (EWT): 21177.63				
		Results	Control Limits	Outside Limit (Yes/No)
Total Lead	g/m ³	0.0504 ± 0.0034	0.045 – 0.055	No

Replicates				
WS: Env. Waters Totals by ICP-MS (EWT): 21177.81				
		Replicate 1	Replicate 2	Pass/Fail
Total Lead	g/m ³	0.555 ± 0.034	0.565 ± 0.034	Pass

Analyst's Comments

Amended Report: This quality assurance report replaces report '3620390-QCPv1' issued on 10-Jul-2024 at 4:53 pm.
Reason for amendment: TCLP lead added to one sample.

#1 Control limits have not been established for this analyte.

#2 The recovery for this analyte was outside the acceptable recovery range of the method. The corresponding sample result was accepted because the related recovery in the other QC material analysed was within the expected range.

Quality Assurance Report

Page 1 of 7

Client:	Aurecon New Zealand Limited	Lab No:	3624078	QCPv1
Contact:	Tiana Hill	Date Received:	10-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	15-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

BTEX in Soil by Headspace GC-MS

		3624078.1	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	127	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3624078.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	112	65 – 130	No
Benzo[a]pyrene-d12	%	117	70 – 140	No
Fluoranthene-d10	%	106	66 – 130	No

BTEX in Soil by Headspace GC-MS

		3624078.2	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	124	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3624078.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	98	65 – 130	No
Benzo[a]pyrene-d12	%	104	70 – 140	No
Fluoranthene-d10	%	101	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.33

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.46

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16059.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16060.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.015 ± 0.032	0.0 – 0.0100	Yes
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16060.1

		Results	Control Limits	Outside Limit (Yes/No)
Anthracene	mg/kg dry wt	< 0.010 ± 0.0061	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.34

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

blank PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6467.2

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	mg/kg dry wt	< 0.05 ± 0.024	0.0 – 0.033	No
Toluene	mg/kg dry wt	< 0.05 ± 0.023	0.0 – 0.033	No
Ethylbenzene	mg/kg dry wt	< 0.05 ± 0.014	0.0 – 0.033	No
m&p-Xylene	mg/kg dry wt	< 0.10 ± 0.037	0.0 – 0.067	No
o-Xylene	mg/kg dry wt	< 0.05 ± 0.026	0.0 – 0.033	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14115.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	116 ± 46	70 – 130	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14116.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	91 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16059.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	100 ± 25	78 – 122	No
2-Methylnaphthalene	%	95 ± 24	72 – 117	No
Acenaphthylene	%	102.0 ± 9.2	75 – 118	No
Acenaphthene	%	103 ± 30	84 – 119	No
Anthracene	%	100 ± 31	79 – 121	No
Benzo[a]anthracene	%	100 ± 27	81 – 123	No
Benzo[a]pyrene (BAP)	%	100.0 ± 7.7	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	97 ± 20	80 – 121	No
Benzo[e]pyrene	%	87.0 ± 6.7	78 – 110	No
Benzo[g,h,i]perylene	%	93 ± 16	80 – 124	No
Benzo[k]fluoranthene	%	96 ± 13	79 – 121	No
Chrysene	%	97 ± 15	83 – 121	No
Dibenzo[a,h]anthracene	%	93 ± 12	78 – 124	No
Fluoranthene	%	98.0 ± 9.9	81 – 122	No
Fluorene	%	104 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	92.0 ± 8.5	83 – 123	No
Naphthalene	%	101 ± 25	84 – 118	No
Perylene	%	90.0 ± 6.9	76 – 107	No
Phenanthrene	%	100 ± 15	84 – 120	No
Pyrene	%	103 ± 14	79 – 123	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16060.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	108 ± 27	78 – 122	No
2-Methylnaphthalene	%	104 ± 26	72 – 117	No
Acenaphthylene	%	118 ± 11	75 – 118	No
Acenaphthene	%	114 ± 33	84 – 119	No
Anthracene	%	112 ± 34	79 – 121	No
Benzo[a]anthracene	%	110 ± 29	81 – 123	No
Benzo[a]pyrene (BAP)	%	106.0 ± 8.1	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	104 ± 22	80 – 121	No
Benzo[e]pyrene	%	91.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	106 ± 19	80 – 124	No
Benzo[k]fluoranthene	%	101 ± 13	79 – 121	No
Chrysene	%	106 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	109 ± 14	78 – 124	No
Fluoranthene	%	109 ± 11	81 – 122	No
Fluorene	%	109 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	107.0 ± 9.9	83 – 123	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16060.2				
		Results	Control Limits	Outside Limit (Yes/No)
Naphthalene	%	104 ± 26	84 – 118	No
Perylene	%	94.0 ± 7.2	76 – 107	No
Phenanthrene	%	109 ± 16	84 – 120	No
Pyrene	%	113 ± 15	79 – 123	No

LCS PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6467.3				
		Results	Control Limits	Outside Limit (Yes/No)
Benzene	%	102.0 ± 9.4	87 – 111	No
Toluene	%	103.0 ± 7.7	89 – 110	No
Ethylbenzene	%	104.0 ± 8.0	95 – 113	No
m&p-Xylene	%	103.0 ± 9.1	87 – 114	No
o-Xylene	%	106.0 ± 8.3	88 – 114	No

Sample Spike QCs

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14115.32				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	107 ± 45	70 – 130	No

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14116.24				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	84 ± 43	70 – 130	No

sample spike PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6467.28				
		Results	Control Limits	Outside Limit (Yes/No)
Benzene	%	129 ± 12	80 – 140	No
Toluene	%	130.0 ± 9.7	83 – 140	No
Ethylbenzene	%	132 ± 11	85 – 143	No
m&p-Xylene	%	131 ± 12	81 – 144	No
o-Xylene	%	134 ± 11	81 – 146	No

Reference Material QCs

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.4 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.9 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.19				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.9 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.415 ± 0.087	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.2 ± 4.0	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.2 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	47.3 ± 7.1	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.0 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	94.8 ± 7.2	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.43				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.1 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.1 ± 1.9	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10683.63

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.3 ± 2.1	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.380 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.1 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.0 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	45.5 ± 6.9	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.3 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	94.0 ± 7.2	79 – 105	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.8 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	11.7 ± 1.8	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.4 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.391 ± 0.085	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.2 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.8 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	45.9 ± 6.9	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.2 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	91.6 ± 7.0	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.34

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.7 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10685.60

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.7 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.373 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.3 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.0 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	47.0 ± 7.1	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.3 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	92.2 ± 7.1	79 – 105	No

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.6 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.2 ± 1.9	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.7 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.379 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	22.9 ± 3.8	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.3 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	44.6 ± 6.7	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.9 ± 1.6	4.6 – 7.0	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	89.1 ± 6.8	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.50

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.3 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.6 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10688.65

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.4 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.375 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	22.8 ± 3.8	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.1 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	48.5 ± 7.3	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.8 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	89.6 ± 6.9	79 – 105	No

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3625593	QCPv1
Contact:	Tiana Hill	Date Received:	11-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	17-Jul-2024	
	PO Box 2292	Quote No:	126272	
	Tauranga 3140	Order No:		
		Client Reference:	521290-064	
		Submitted By:	Andrew Allcock	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3625593.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	106	65 – 130	No
Benzo[a]pyrene-d12	%	106	70 – 140	No
Fluoranthene-d10	%	104	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3625593.4	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	107	65 – 130	No
Benzo[a]pyrene-d12	%	120	70 – 140	No
Fluoranthene-d10	%	118	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.40

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16067.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.018 ± 0.032	0.0 – 0.0100	Yes #1
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16067.1

		Results	Control Limits	Outside Limit (Yes/No)
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0063	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14125.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	92 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16067.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	99 ± 25	78 – 122	No
2-Methylnaphthalene	%	92 ± 23	72 – 117	No
Acenaphthylene	%	103.0 ± 9.3	75 – 118	No
Acenaphthene	%	107 ± 31	84 – 119	No
Anthracene	%	106 ± 33	79 – 121	No
Benzo[a]anthracene	%	108 ± 29	81 – 123	No
Benzo[a]pyrene (BAP)	%	104.0 ± 8.0	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	103 ± 22	80 – 121	No
Benzo[e]pyrene	%	90.0 ± 6.9	78 – 110	No
Benzo[g,h,i]perylene	%	103 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	105 ± 14	79 – 121	No
Chrysene	%	99 ± 15	83 – 121	No
Dibenzo[a,h]anthracene	%	103 ± 14	78 – 124	No
Fluoranthene	%	107 ± 11	81 – 122	No
Fluorene	%	109 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	102.0 ± 9.4	83 – 123	No
Naphthalene	%	106 ± 26	84 – 118	No
Perylene	%	87.0 ± 6.7	76 – 107	No
Phenanthrene	%	101 ± 15	84 – 120	No
Pyrene	%	110 ± 15	79 – 123	No

Sample Spike QCs

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14125.27

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	89 ± 43	70 – 130	No

Reference Material QCs

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.0 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	13.6 ± 2.1	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.5 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.377 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.1 ± 4.2	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.8 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	44.7 ± 6.7	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.8 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	97.5 ± 7.4	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.29

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.2 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	14.1 ± 2.2	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10699.45

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.2 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.412 ± 0.087	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.0 ± 4.0	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.0 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	47.2 ± 7.1	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.5 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	102.4 ± 7.7	79 – 105	No

Analyst's Comments

#1 Elevated blank levels were observed for this analyte. The reporting limit has been increased due to consistent background levels.

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3629193	QCPv3
Contact:	Tiana Hill	Date Received:	17-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	12-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290 - 064	
		Submitted By:	Andrew Allcock	

Sample Specific QCs

BTEX in Soil by Headspace GC-MS

		3629193.1	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	112	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3629193.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	102	65 – 130	No
Benzo[a]pyrene-d12	%	108	70 – 140	No
Fluoranthene-d10	%	99	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.29

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16081.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	0.011 ± 0.032	0.0 – 0.0100	Yes
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16081.1

		Results	Control Limits	Outside Limit (Yes/No)
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

blank PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6476.2

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	mg/kg dry wt	< 0.05 ± 0.024	0.0 – 0.033	No
Toluene	mg/kg dry wt	< 0.05 ± 0.023	0.0 – 0.033	No
Ethylbenzene	mg/kg dry wt	< 0.05 ± 0.014	0.0 – 0.033	No
m&p-Xylene	mg/kg dry wt	< 0.10 ± 0.037	0.0 – 0.067	No
o-Xylene	mg/kg dry wt	< 0.05 ± 0.026	0.0 – 0.033	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.23

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.48

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.71

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No

QC Spike QCs
LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14137.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	91 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16081.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	99 ± 25	78 – 122	No
2-Methylnaphthalene	%	94 ± 23	72 – 117	No
Acenaphthylene	%	104.0 ± 9.4	75 – 118	No
Acenaphthene	%	105 ± 30	84 – 119	No
Anthracene	%	100 ± 31	79 – 121	No
Benzo[a]anthracene	%	105 ± 28	81 – 123	No
Benzo[a]pyrene (BAP)	%	104.0 ± 8.0	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	104 ± 22	80 – 121	No
Benzo[e]pyrene	%	91.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	112 ± 20	80 – 124	No
Benzo[k]fluoranthene	%	105 ± 14	79 – 121	No
Chrysene	%	102 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	115 ± 15	78 – 124	No
Fluoranthene	%	97.0 ± 9.8	81 – 122	No
Fluorene	%	108 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	110 ± 11	83 – 123	No
Naphthalene	%	101 ± 25	84 – 118	No
Perylene	%	92.0 ± 7.0	76 – 107	No
Phenanthrene	%	100 ± 15	84 – 120	No
Pyrene	%	106 ± 14	79 – 123	No

LCS PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6476.3

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	%	102.0 ± 9.4	87 – 111	No
Toluene	%	102.0 ± 7.6	89 – 110	No
Ethylbenzene	%	105.0 ± 8.0	95 – 113	No
m&p-Xylene	%	103.0 ± 9.1	87 – 114	No
o-Xylene	%	105.0 ± 8.2	88 – 114	No

Sample Spike QCs
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14137.12

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	88 ± 43	70 – 130	No

sample spike PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6476.8

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	%	113 ± 11	80 – 140	No
Toluene	%	116.0 ± 8.6	83 – 140	No

sample spike PrepWS xsMeBTEx PrepWS apHSV - BTEX by Headspace Soil Analysis: 6476.8				
		Results	Control Limits	Outside Limit (Yes/No)
Ethylbenzene	%	121.0 ± 9.2	85 – 143	No
m&p-Xylene	%	118 ± 11	81 – 144	No
o-Xylene	%	121.0 ± 9.5	81 – 146	No

Reference Material QCs

QC A7 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.0 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.4 ± 1.9	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.9 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.403 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	26.1 ± 4.3	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.8 ± 3.3	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	44.3 ± 6.7	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	7.1 ± 1.6	4.6 – 7.0	Yes #1
Total Recoverable Zinc	mg/kg dry wt	101.0 ± 7.6	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.39

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.2 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	11.5 ± 1.8	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10720.59

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.5 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.430 ± 0.089	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.8 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.9 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	43.3 ± 6.5	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.3 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	96.8 ± 7.4	79 – 105	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.8 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.89 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.9 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.4 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.4 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	201 ± 15	171 – 230	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.7 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.403 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.9 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.8 ± 3.2	17.0 – 22	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.19				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	45.1 ± 6.8	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.9 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	94.5 ± 7.2	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.26				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.3 ± 2.3	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	13.3 ± 2.0	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10742.31				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.0 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.411 ± 0.087	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.7 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.3 ± 3.2	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	47.1 ± 7.1	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.0 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	97.2 ± 7.4	79 – 105	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.3 ± 2.2	9.3 – 12.9	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.19				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.6 ± 2.1	8.0 – 11.0	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.23				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.6 ± 2.1	8.0 – 11.0	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.33				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.2 ± 2.3	9.4 – 13.9	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.72				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	9.3 – 12.9	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10828.74				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.5 ± 2.0	8.0 – 11.0	No

Analyst's Comments

Amended Report: This quality assurance report replaces report '3629193-QCPv2' issued on 23-Jul-2024 at 3:27 pm.
Reason for amendment: Testing added to sample 2.

#1 The recovery for this analyte was outside the acceptable recovery range of the method. The corresponding sample result was accepted because the related recovery in the other QC material analysed was within the expected range.

Quality Assurance Report

Page 1 of 6

Client:	Aurecon New Zealand Limited	Lab No:	3634409	QCPv1
Contact:	Tiana Hill	Date Received:	24-Jul-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	29-Jul-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3634409.4	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	107	65 – 130	No
Benzo[a]pyrene-d12	%	109	70 – 140	No
Fluoranthene-d10	%	108	66 – 130	No

Blank QCs

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16105.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.40

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.62

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.43

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.43				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.78				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

QC Spike QCs				
LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14155.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	100 ± 44	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16105.2				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	111 ± 28	78 – 122	No
2-Methylnaphthalene	%	106 ± 26	72 – 117	No
Acenaphthylene	%	108.0 ± 9.8	75 – 118	No
Acenaphthene	%	108 ± 31	84 – 119	No
Anthracene	%	112 ± 34	79 – 121	No
Benzo[a]anthracene	%	110 ± 29	81 – 123	No
Benzo[a]pyrene (BAP)	%	108.0 ± 8.3	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	106 ± 22	80 – 121	No
Benzo[e]pyrene	%	92.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	104 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	103 ± 13	79 – 121	No
Chrysene	%	108 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	106 ± 14	78 – 124	No
Fluoranthene	%	104 ± 11	81 – 122	No
Fluorene	%	105 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	104.0 ± 9.6	83 – 123	No
Naphthalene	%	107 ± 27	84 – 118	No
Perylene	%	93.0 ± 7.1	76 – 107	No
Phenanthrene	%	107 ± 15	84 – 120	No
Pyrene	%	107 ± 14	79 – 123	No

Sample Spike QCs				
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14155.12				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	90 ± 43	70 – 130	No

Spike PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16105.4				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	110 ± 27	77 – 126	No

Spike PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16105.4				
		Results	Control Limits	Outside Limit (Yes/No)
2-Methylnaphthalene	%	105 ± 26	71 – 121	No
Acenaphthylene	%	106.0 ± 9.6	75 – 120	No
Acenaphthene	%	108 ± 31	84 – 121	No
Anthracene	%	109 ± 33	80 – 122	No
Benzo[a]anthracene	%	107 ± 28	81 – 126	No
Benzo[a]pyrene (BAP)	%	105.0 ± 8.0	77 – 125	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	104 ± 22	79 – 125	No
Benzo[e]pyrene	%	91.0 ± 7.0	77 – 115	No
Benzo[g,h,i]perylene	%	103 ± 18	77 – 129	No
Benzo[k]fluoranthene	%	101 ± 13	81 – 123	No
Chrysene	%	105 ± 16	83 – 125	No
Dibenzo[a,h]anthracene	%	104 ± 14	78 – 128	No
Fluoranthene	%	102 ± 11	78 – 127	No
Fluorene	%	106 ± 13	86 – 125	No
Indeno(1,2,3-c,d)pyrene	%	102.0 ± 9.4	80 – 129	No
Naphthalene	%	107 ± 27	84 – 120	No
Perylene	%	92.0 ± 7.0	78 – 110	No
Phenanthrene	%	106 ± 15	82 – 123	No
Pyrene	%	103 ± 14	76 – 128	No

Reference Material QCs

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.0 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.9 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.0 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.6 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	199 ± 15	171 – 230	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.2 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.400 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	25.1 ± 4.1	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	21.7 ± 3.3	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	44.5 ± 6.7	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.7 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	105.0 ± 7.9	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.33

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	11.5 ± 1.8	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10760.55

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.8 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.400 ± 0.086	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.7 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.4 ± 3.0	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	42.6 ± 6.4	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.7 ± 1.5	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	94.1 ± 7.2	79 – 105	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.3 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.88 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.4 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.2 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.1 ± 5.2	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.5 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	207 ± 15	171 – 230	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.2 ± 1.9	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.420 ± 0.088	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.4 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.3 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	46.3 ± 7.0	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.1 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	93.6 ± 7.1	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.24

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	11.6 ± 1.8	10.0 – 14.8	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10761.71

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.4 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.452 ± 0.091	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.0 ± 3.8	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.6 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	42.7 ± 6.4	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.9 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	87.1 ± 6.7	79 – 105	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.2 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.95 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	28.0 ± 4.6	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.3 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.4 ± 5.4	29 – 38	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	15.0 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	210 ± 15	171 – 230	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.19

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.8 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.410 ± 0.087	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	24.2 ± 4.0	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	19.9 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	44.6 ± 6.7	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.3 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	93.4 ± 7.1	79 – 105	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.28

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.0 ± 2.0	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.374 ± 0.084	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.7 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	20.2 ± 3.1	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	45.2 ± 6.8	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	6.6 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	97.6 ± 7.4	79 – 105	No

QC A7 dup 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.47

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.9 ± 2.4	9.4 – 13.9	No
Total Recoverable Lead	mg/kg dry wt	12.8 ± 2.0	10.0 – 14.8	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.79

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.5 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.81 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.4 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.7 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.9 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.3 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	199 ± 15	171 – 230	No

QC A8 FG PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10763.81

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.0 ± 1.9	8.0 – 11.0	No
Total Recoverable Cadmium	mg/kg dry wt	0.395 ± 0.085	0.32 – 0.45	No
Total Recoverable Chromium	mg/kg dry wt	23.1 ± 3.9	15.5 – 27	No
Total Recoverable Copper	mg/kg dry wt	18.7 ± 2.9	17.0 – 22	No
Total Recoverable Lead	mg/kg dry wt	42.3 ± 6.4	39 – 51	No
Total Recoverable Nickel	mg/kg dry wt	5.9 ± 1.6	4.6 – 7.0	No
Total Recoverable Zinc	mg/kg dry wt	92.5 ± 7.1	79 – 105	No

Quality Assurance Report

Page 1 of 5

Client:	Aurecon New Zealand Limited	Lab No:	3651482	QCPv1
Contact:	Tiana Hill	Date Received:	16-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	21-Aug-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3651482.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	102	65 – 130	No
Benzo[a]pyrene-d12	%	114	70 – 140	No
Fluoranthene-d10	%	110	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3651482.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	106	65 – 130	No
Benzo[a]pyrene-d12	%	116	70 – 140	No
Fluoranthene-d10	%	113	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3651482.3	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	87	65 – 130	No
Benzo[a]pyrene-d12	%	103	70 – 140	No
Fluoranthene-d10	%	119	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3651482.6	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	107	65 – 130	No
Benzo[a]pyrene-d12	%	112	70 – 140	No
Fluoranthene-d10	%	110	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3651482.7	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	102	65 – 130	No
Benzo[a]pyrene-d12	%	110	70 – 140	No
Fluoranthene-d10	%	103	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10866.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10866.34

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10867.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10867.23

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16188.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16188.1				
		Results	Control Limits	Outside Limit (Yes/No)
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16189.1				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	0.010 ± 0.032	0.0 – 0.0100	Yes #1
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14208.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	97 ± 44	70 – 130	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14209.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	98 ± 44	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16188.2				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	99 ± 25	78 – 122	No
2-Methylnaphthalene	%	90 ± 22	72 – 117	No
Acenaphthylene	%	95.0 ± 8.6	75 – 118	No
Acenaphthene	%	106 ± 31	84 – 119	No
Anthracene	%	105 ± 32	79 – 121	No
Benzo[a]anthracene	%	103 ± 27	81 – 123	No
Benzo[a]pyrene (BAP)	%	105.0 ± 8.0	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	103 ± 22	80 – 121	No
Benzo[e]pyrene	%	92.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	101 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	101 ± 13	79 – 121	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16188.2

		Results	Control Limits	Outside Limit (Yes/No)
Chrysene	%	106 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	99 ± 13	78 – 124	No
Fluoranthene	%	112 ± 12	81 – 122	No
Fluorene	%	104 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	98.0 ± 9.1	83 – 123	No
Naphthalene	%	102 ± 25	84 – 118	No
Perylene	%	92.0 ± 7.0	76 – 107	No
Phenanthrene	%	107 ± 15	84 – 120	No
Pyrene	%	101 ± 13	79 – 123	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16189.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	101 ± 25	78 – 122	No
2-Methylnaphthalene	%	96 ± 24	72 – 117	No
Acenaphthylene	%	107.0 ± 9.7	75 – 118	No
Acenaphthene	%	107 ± 31	84 – 119	No
Anthracene	%	105 ± 32	79 – 121	No
Benzo[a]anthracene	%	108 ± 29	81 – 123	No
Benzo[a]pyrene (BAP)	%	116.0 ± 8.9	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	122 ± 25	80 – 121	Yes #2
Benzo[e]pyrene	%	103.0 ± 7.9	78 – 110	No
Benzo[g,h,i]perylene	%	104 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	121 ± 16	79 – 121	No
Chrysene	%	100 ± 15	83 – 121	No
Dibenzo[a,h]anthracene	%	100 ± 13	78 – 124	No
Fluoranthene	%	106 ± 11	81 – 122	No
Fluorene	%	110 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	105.0 ± 9.7	83 – 123	No
Naphthalene	%	102 ± 25	84 – 118	No
Perylene	%	97.0 ± 7.4	76 – 107	No
Phenanthrene	%	103 ± 15	84 – 120	No
Pyrene	%	100 ± 13	79 – 123	No

Sample Spike QCs
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14209.30

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	96 ± 44	70 – 130	No

Reference Material QCs
SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10866.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.7 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.0 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.4 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.3 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.1 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	200 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10866.24				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.6 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.83 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.6 ± 4.1	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.6 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.7 ± 4.9	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.6 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	189 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10867.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.3 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.88 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	28.6 ± 4.7	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.8 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.9 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.7 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	209 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10867.32				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.1 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.89 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.8 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.4 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.5 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.2 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	201 ± 15	171 – 230	No

Analyst's Comments

#1 The corresponding data was accepted as the blank level is at the Method Detection Limit (MDL).

#2 The Laboratory Control Spike (LCS) recovery for this analyte was over the acceptable recovery range of the method. The corresponding sample result was accepted because the rest of the targets in the LCS were within the expected ranges.

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3655466	QCPv2
Contact:	Andrew Allcock	Date Received:	22-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	28-Aug-2024	(Amended)
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:	126272	
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3655466.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	102	65 – 130	No
Benzo[a]pyrene-d12	%	100	70 – 140	No
Fluoranthene-d10	%	103	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3655466.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	106	65 – 130	No
Benzo[a]pyrene-d12	%	107	70 – 140	No
Fluoranthene-d10	%	108	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3655466.3	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	108	65 – 130	No
Benzo[a]pyrene-d12	%	108	70 – 140	No
Fluoranthene-d10	%	109	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.36

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16210.1				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	0.011 ± 0.032	0.0 – 0.0100	Yes #1
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10902.16				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10902.31				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

QC Spike QCs				
LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14227.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	89 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16210.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	102 ± 25	78 – 122	No
2-Methylnaphthalene	%	100 ± 25	72 – 117	No
Acenaphthylene	%	108.0 ± 9.8	75 – 118	No
Acenaphthene	%	107 ± 31	84 – 119	No
Anthracene	%	102 ± 31	79 – 121	No
Benzo[a]anthracene	%	100 ± 27	81 – 123	No
Benzo[a]pyrene (BAP)	%	81.0 ± 6.2	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	90 ± 19	80 – 121	No
Benzo[e]pyrene	%	92.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene	%	95 ± 17	80 – 124	No
Benzo[k]fluoranthene	%	88 ± 12	79 – 121	No
Chrysene	%	95 ± 15	83 – 121	No
Dibenzo[a,h]anthracene	%	96 ± 13	78 – 124	No
Fluoranthene	%	113 ± 12	81 – 122	No
Fluorene	%	104 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	96.0 ± 8.9	83 – 123	No
Naphthalene	%	103 ± 26	84 – 118	No
Perylene	%	81.0 ± 6.2	76 – 107	No
Phenanthrene	%	101 ± 15	84 – 120	No
Pyrene	%	106 ± 14	79 – 123	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14229.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	94 ± 44	70 – 130	No

Sample Spike QCs
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14227.18

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	92 ± 43	70 – 130	No

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14229.11

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	96 ± 44	70 – 130	No

Reference Material QCs
SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.3 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.97 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	30.4 ± 4.9	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	15.5 ± 2.5	11.6 – 15.3	Yes #2
Total Recoverable Lead	mg/kg dry wt	37.2 ± 5.6	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	16.4 ± 2.5	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	228 ± 17	171 – 230	No

AGAL-12 QC PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.24

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	3.8 ± 1.5	3.1 – 4.2	No
Total Recoverable Cadmium	mg/kg dry wt	0.78 ± 0.13	0.66 – 0.88	No
Total Recoverable Chromium	mg/kg dry wt	32.4 ± 5.2	27 – 35	No

AGAL-12 QC PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.24

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Copper	mg/kg dry wt	160 ± 22	140 – 168	No
Total Recoverable Lead	mg/kg dry wt	33.4 ± 5.0	29 – 36	No
Total Recoverable Nickel	mg/kg dry wt	15.9 ± 2.5	13.3 – 17.3	No
Total Recoverable Zinc	mg/kg dry wt	191 ± 14	165 – 200	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10898.45

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.86 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.4 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	199 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10902.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.0 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.90 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.5 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.9 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.2 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.1 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	210 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10902.38

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.1 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.9 ± 4.6	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.4 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.3 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	205 ± 15	171 – 230	No

Analyst's Comments

Amended Report: This quality assurance report replaces report '3655466-QCPv1' issued on 28-Aug-2024 at 9:53 am.
Reason for amendment: IDs updated.

#1 The corresponding data was accepted as the blank level is at the Method Detection Limit (MDL).

#2 The recovery for this analyte was outside the acceptable recovery range of the method. The corresponding sample result was accepted because the related recovery in the other QC material analysed was within the expected range.

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3658963	QCPv1
Contact:	Tiana Hill	Date Received:	28-Aug-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	02-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3658963.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	106	65 – 130	No
Benzo[a]pyrene-d12	%	104	70 – 140	No
Fluoranthene-d10	%	111	66 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3658963.4	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	99	65 – 130	No
Benzo[a]pyrene-d12	%	100	70 – 140	No
Fluoranthene-d10	%	94	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10921.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10921.42

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.39

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.75

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.41

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.75

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.75

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.38

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.53

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16225.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.031	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16225.1				
		Results	Control Limits	Outside Limit (Yes/No)
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.032	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14235.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	84 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16225.2				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	99 ± 25	78 – 122	No
2-Methylnaphthalene	%	94 ± 23	72 – 117	No
Acenaphthylene	%	104.0 ± 9.4	75 – 118	No
Acenaphthene	%	106 ± 31	84 – 119	No
Anthracene	%	102 ± 31	79 – 121	No
Benzo[a]anthracene	%	112 ± 30	81 – 123	No
Benzo[a]pyrene (BAP)	%	106.0 ± 8.1	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	106 ± 22	80 – 121	No
Benzo[e]pyrene	%	93.0 ± 7.1	78 – 110	No
Benzo[g,h,i]perylene	%	101 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	102 ± 13	79 – 121	No
Chrysene	%	105 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	105 ± 14	78 – 124	No
Fluoranthene	%	97.0 ± 9.8	81 – 122	No
Fluorene	%	111 ± 14	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	103.0 ± 9.5	83 – 123	No
Naphthalene	%	101 ± 25	84 – 118	No
Perylene	%	93.0 ± 7.1	76 – 107	No
Phenanthrene	%	106 ± 15	84 – 120	No
Pyrene	%	108 ± 14	79 – 123	No

Sample Spike QCs

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14235.20				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	84 ± 43	70 – 130	No

Reference Material QCs

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10921.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.5 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.7 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.0 ± 5.0	29 – 38	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10921.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	15.3 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	205 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10921.53				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.4 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.91 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	28.9 ± 4.7	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.1 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.2 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	16.0 ± 2.5	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	209 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.0 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.86 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.5 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.0 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.9 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.7 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	209 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.53				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.9 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.92 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	28.4 ± 4.6	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.9 ± 2.5	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	37.0 ± 5.6	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.4 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	214 ± 16	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10922.76				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.0 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.87 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.7 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.3 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.1 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	194 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.5 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.81 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.0 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.4 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.1 ± 5.0	29 – 38	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	14.4 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	196 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.51				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.2 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.84 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	28.8 ± 4.7	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.5 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.1 ± 5.0	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.0 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	201 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10923.76				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.1 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.79 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.3 ± 4.2	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.8 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	31.5 ± 4.8	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	12.9 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	188 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.3 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.90 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.6 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.4 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.9 ± 5.4	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.0 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	207 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.47				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.2 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.85 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.5 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.8 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.1 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	203 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.55				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.7 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.80 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.2 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.5 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.6 ± 4.9	29 – 38	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10924.55				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	13.6 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	196 ± 15	171 – 230	No

Quality Assurance Report

Page 1 of 3

Client:	Aurecon New Zealand Limited	Lab No:	3664138	QCPv1
Contact:	Tiana Hill	Date Received:	04-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	09-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3664138.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	100	65 – 130	No
Benzo[a]pyrene-d12	%	99	70 – 140	No
Fluoranthene-d10	%	102	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.35

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.74

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16246.1				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0067	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14251.4

	Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36) %	84 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16246.2

	Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene %	112 ± 28	78 – 122	No
2-Methylnaphthalene %	107 ± 27	72 – 117	No
Acenaphthylene %	112 ± 11	75 – 118	No
Acenaphthene %	112 ± 32	84 – 119	No
Anthracene %	113 ± 35	79 – 121	No
Benzo[a]anthracene %	109 ± 29	81 – 123	No
Benzo[a]pyrene (BAP) %	108.0 ± 8.3	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene %	103 ± 22	80 – 121	No
Benzo[e]pyrene %	91.0 ± 7.0	78 – 110	No
Benzo[g,h,i]perylene %	102 ± 18	80 – 124	No
Benzo[k]fluoranthene %	101 ± 13	79 – 121	No
Chrysene %	107 ± 16	83 – 121	No
Dibenzo[a,h]anthracene %	108 ± 14	78 – 124	No
Fluoranthene %	109 ± 11	81 – 122	No
Fluorene %	112 ± 14	86 – 122	No
Indeno(1,2,3-c,d)pyrene %	107.0 ± 9.9	83 – 123	No
Naphthalene %	110 ± 27	84 – 118	No
Perylene %	96.0 ± 7.3	76 – 107	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16246.2				
		Results	Control Limits	Outside Limit (Yes/No)
Phenanthrene	%	109 ± 16	84 – 120	No
Pyrene	%	103 ± 14	79 – 123	No

Sample Spike QCs

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14251.27

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	82 ± 42	70 – 130	No

Reference Material QCs

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.1 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.85 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.2 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.2 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.8 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	197 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.57

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.5 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.82 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.9 ± 4.1	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.4 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.3 ± 4.9	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.4 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	188 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10958.75

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.1 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.78 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.0 ± 4.0	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.3 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	30.6 ± 4.6	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	12.7 ± 2.1	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	183 ± 14	171 – 230	No

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3670643	QCPv1
Contact:	Tiana Hill	Date Received:	12-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	16-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3670643.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	110	65 – 130	No
Benzo[a]pyrene-d12	%	100	70 – 140	No
Fluoranthene-d10	%	107	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.33

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.80

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10997.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10997.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16267.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.031	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.031	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16267.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.10 ± 0.031	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.10 ± 0.032	0.0 – 0.0100	Yes #1
Acenaphthylene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.10 ± 0.0060	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16267.2

		Results	Control Limits	Outside Limit (Yes/No)
Anthracene	mg/kg dry wt	< 0.10 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.10 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.10 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.10 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.5 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.10 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14268.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	93 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16267.3

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	107 ± 27	78 – 122	No
2-Methylnaphthalene	%	97 ± 24	72 – 117	No
Acenaphthylene	%	103.0 ± 9.3	75 – 118	No
Acenaphthene	%	108 ± 31	84 – 119	No
Anthracene	%	95 ± 29	79 – 121	No
Benzo[a]anthracene	%	94 ± 25	81 – 123	No
Benzo[a]pyrene (BAP)	%	116.0 ± 8.9	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	113 ± 24	80 – 121	No
Benzo[e]pyrene	%	110.0 ± 8.4	78 – 110	No
Benzo[g,h,i]perylene	%	112 ± 20	80 – 124	No
Benzo[k]fluoranthene	%	121 ± 16	79 – 121	No
Chrysene	%	110 ± 17	83 – 121	No
Dibenzo[a,h]anthracene	%	122 ± 16	78 – 124	No
Fluoranthene	%	100 ± 11	81 – 122	No
Fluorene	%	109 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	109 ± 11	83 – 123	No
Naphthalene	%	103 ± 26	84 – 118	No
Perylene	%	106.0 ± 8.1	76 – 107	No
Phenanthrene	%	108 ± 16	84 – 120	No
Pyrene	%	102 ± 14	79 – 123	No

Sample Spike QCs

Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14268.26

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	86 ± 43	70 – 130	No

Reference Material QCs

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.6 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.88 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.3 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.7 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.1 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	203 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.48

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.6 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.91 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.8 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.6 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	35.9 ± 5.4	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.0 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	204 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10996.81

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.5 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.80 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.0 ± 4.1	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.7 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	31.1 ± 4.7	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.4 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	189 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10997.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.9 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.90 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.4 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.8 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.8 ± 5.2	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.2 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	206 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10997.43

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.2 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.91 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.6 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.4 ± 2.4	11.6 – 15.3	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 10997.43				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Lead	mg/kg dry wt	35.4 ± 5.4	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.8 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	217 ± 16	171 – 230	No
Analyst's Comments				
#1 False alert. Result is less than detection limit.				

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3674838	QCPv1
Contact:	Tiana Hill	Date Received:	18-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	23-Sep-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-64	
		Submitted By:	Tiana Hill	

Sample Specific QCs

BTEX in Soil by Headspace GC-MS

		3674838.1	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	114	72 – 140	No

SMC Compounds in SVOC Soil Samples by GC-MS

		3674838.1	Control Limits	Outside Limit (Yes/No)
2-fluorobiphenyl	%	90	40 – 120	No
2-fluorophenol	%	85	40 – 120	No
Nitrobenzene-d5	%	89	40 – 120	No
Phenol-d5	%	72	40 – 120	No
Terphenyl-d14	%	99	40 – 120	No
2,4,6-Tribromophenol	%	77	40 – 120	No

BTEX in Soil by Headspace GC-MS

		3674838.2	Control Limits	Outside Limit (Yes/No)
Benzene-d6	%	119	72 – 140	No

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3674838.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	100	65 – 130	No
Benzo[a]pyrene-d12	%	103	70 – 140	No
Fluoranthene-d10	%	98	66 – 130	No

Blank QCs

blank PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6533.2

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	mg/kg dry wt	< 0.05 ± 0.024	0.0 – 0.033	No
Toluene	mg/kg dry wt	< 0.05 ± 0.023	0.0 – 0.033	No
Ethylbenzene	mg/kg dry wt	< 0.05 ± 0.014	0.0 – 0.033	No
m&p-Xylene	mg/kg dry wt	< 0.10 ± 0.037	0.0 – 0.067	No
o-Xylene	mg/kg dry wt	< 0.05 ± 0.026	0.0 – 0.033	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11023.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11023.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11023.33

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.27	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16290.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.032	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

QC Spike QCs
LCS PrepWS xsMeBTEX PrepWS apHSV - BTEX by Headspace Soil Analysis: 6533.3

		Results	Control Limits	Outside Limit (Yes/No)
Benzene	%	93.0 ± 8.6	87 – 111	No
Toluene	%	96.0 ± 7.2	89 – 110	No
Ethylbenzene	%	97.0 ± 7.4	95 – 113	No
m&p-Xylene	%	96.0 ± 8.5	87 – 114	No
o-Xylene	%	98.0 ± 7.7	88 – 114	No

LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14281.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	89 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16290.2

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	109 ± 27	78 – 122	No
2-Methylnaphthalene	%	109 ± 27	72 – 117	No
Acenaphthylene	%	111 ± 10	75 – 118	No
Acenaphthene	%	109 ± 31	84 – 119	No
Anthracene	%	107 ± 33	79 – 121	No
Benzo[a]anthracene	%	110 ± 29	81 – 123	No
Benzo[a]pyrene (BAP)	%	102.0 ± 7.8	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	100 ± 21	80 – 121	No
Benzo[e]pyrene	%	86.0 ± 6.6	78 – 110	No
Benzo[g,h,i]perylene	%	105 ± 19	80 – 124	No
Benzo[k]fluoranthene	%	94 ± 12	79 – 121	No
Chrysene	%	103 ± 16	83 – 121	No
Dibenzo[a,h]anthracene	%	104 ± 14	78 – 124	No
Fluoranthene	%	107 ± 11	81 – 122	No
Fluorene	%	106 ± 13	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	106.0 ± 9.8	83 – 123	No
Naphthalene	%	106 ± 26	84 – 118	No
Perylene	%	89.0 ± 6.8	76 – 107	No
Phenanthrene	%	109 ± 16	84 – 120	No
Pyrene	%	118 ± 16	79 – 123	No

Sample Spike QCs
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14281.23

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	86 ± 43	70 – 130	No

Reference Material QCs
SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11023.17

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.4 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.82 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.1 ± 4.5	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.5 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.9 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	198 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11023.48

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.2 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.82 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	29.5 ± 4.8	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.0 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.5 ± 5.2	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.2 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	198 ± 15	171 – 230	No

Quality Assurance Report

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Client:	Aurecon New Zealand Limited	Lab No:	3680726	QCPv1
Contact:	Tiana Hill	Date Received:	26-Sep-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	04-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq

		3680726.1	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	113	40 – 130	No
Benzo[a]pyrene-d12	%	120	40 – 130	No
Fluoranthene-d10	%	110	40 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq

		3680726.2	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	105	40 – 130	No
Benzo[a]pyrene-d12	%	119	40 – 130	No
Fluoranthene-d10	%	111	40 – 130	No

SMC Compounds in SVOC Water Samples by GC-MS

		3680726.2	Control Limits	Outside Limit (Yes/No)
2-fluorobiphenyl	%	74	40 – 120	No
2-fluorophenol	%	67	40 – 120	No
Nitrobenzene-d5	%	75	40 – 120	No
Phenol-d5	%	63	40 – 120	No
Terphenyl-d14	%	44	40 – 120	No
2,4,6-Tribromophenol	%	70	40 – 120	No

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq

		3680726.4	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	111	40 – 130	No
Benzo[a]pyrene-d12	%	120	40 – 130	No
Fluoranthene-d10	%	110	40 – 130	No

SMC Compounds in SVOC Water Samples by GC-MS

		3680726.4	Control Limits	Outside Limit (Yes/No)
2-fluorobiphenyl	%	76	40 – 120	No
2-fluorophenol	%	68	40 – 120	No
Nitrobenzene-d5	%	78	40 – 120	No
Phenol-d5	%	67	40 – 120	No
Terphenyl-d14	%	37	40 – 120	Yes
2,4,6-Tribromophenol	%	70	40 – 120	No

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq

		3680726.5	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	112	40 – 130	No
Benzo[a]pyrene-d12	%	120	40 – 130	No

Polycyclic Aromatic Hydrocarbons Screening in Water, By Liq/Liq				
		3680726.5	Control Limits	Outside Limit (Yes/No)
Fluoranthene-d10	%	109	40 – 130	No

SMC Compounds in SVOC Water Samples by GC-MS				
		3680726.5	Control Limits	Outside Limit (Yes/No)
2-fluorobiphenyl	%	76	40 – 120	No
2-fluorophenol	%	66	40 – 120	No
Nitrobenzene-d5	%	74	40 – 120	No
Phenol-d5	%	65	40 – 120	No
Terphenyl-d14	%	48	40 – 120	No
2,4,6-Tribromophenol	%	69	40 – 120	No

Blank QCs				
FBlank PrepWS DissPrep 1 - WS: Environmental Waters by ICP-MS (EW): 21338.22				
		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Zinc	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

FBlank PrepWS DissPrep 2 - WS: Environmental Waters by ICP-MS (EW): 21338.23				
		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Zinc	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

ARBlank PrepWS DissPrep 1 - WS: Environmental Waters by ICP-MS (EW): 21338.24				
		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Zinc	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

ARBlank PrepWS DissPrep 2 - WS: Environmental Waters by ICP-MS (EW): 21338.25				
		Results	Control Limits	Outside Limit (Yes/No)
Dissolved Arsenic	g/m³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No
Dissolved Cadmium	g/m³	< 0.00005 ± 0.000033	-0.000050 – 0.000050	No
Dissolved Chromium	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Copper	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No
Dissolved Lead	g/m³	< 0.00010 ± 0.000067	-0.000100 – 0.000100	No
Dissolved Nickel	g/m³	< 0.0005 ± 0.00034	-0.00050 – 0.00050	No

ARBlank PrepWS DissPrep 2 - WS: Environmental Waters by ICP-MS (EW): 21338.25

	Results	Control Limits	Outside Limit (Yes/No)
Dissolved Zinc g/m ³	< 0.0010 ± 0.00067	-0.00100 – 0.00100	No

Blank PrepWS xwTPH - WS: Total Petroleum Hydrocarbons Water Analysis: 8575.2

	Results	Control Limits	Outside Limit (Yes/No)
C7 - C9 g/m ³	< 0.10 ± 0.060	0.0 – 0.075	No
C10 - C11 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C12 - C14 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C15 - C20 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C21 - C25 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C26 - C29 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C30 - C36 g/m ³	< 0.10	0.0 – 0.100	No

Blank PrepWS xwTPH - WS: Total Petroleum Hydrocarbons Water Analysis: 8575.20

	Results	Control Limits	Outside Limit (Yes/No)
C7 - C9 g/m ³	< 0.10 ± 0.060	0.0 – 0.075	No
C10 - C11 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C12 - C14 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C15 - C20 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C21 - C25 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C26 - C29 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C30 - C36 g/m ³	< 0.10	0.0 – 0.100	No

Blank 2 PrepWS xwTPH - WS: Total Petroleum Hydrocarbons Water Analysis: 8575.26

	Results	Control Limits	Outside Limit (Yes/No)
C7 - C9 g/m ³	< 0.10 ± 0.061	0.0 – 0.075	No
C10 - C11 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C12 - C14 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C15 - C20 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C21 - C25 g/m ³	< 0.10 ± 0.061	0.0 – 0.100	No
C26 - C29 g/m ³	< 0.10 ± 0.060	0.0 – 0.100	No
C30 - C36 g/m ³	< 0.10	0.0 – 0.100	No

blank PrepWS xwSVasc - Semivolatile Water Analysis: 4898.1

	Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Acenaphthylene g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Aldrin g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
Anthracene g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Benzo[a]anthracene g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Benzo[a]pyrene (BAP) g/m ³	< 0.003 ± 0.00092	0.0 – 0.00025	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene g/m ³	< 0.003 ± 0.0013	0.0 – 0.00025	No
Benzo[g,h,i]perylene g/m ³	< 0.003 ± 0.00099	0.0 – 0.00025	No
Benzo[k]fluoranthene g/m ³	< 0.003 ± 0.0012	0.0 – 0.00025	No
Benzyl alcohol g/m ³	< 0.05 ± 0.017	0.0 – 0.0025	No
alpha-BHC g/m ³	< 0.005 ± 0.0030	0.0 – 0.00025	No
beta-BHC g/m ³	< 0.005 ± 0.0031	0.0 – 0.00025	No
delta-BHC g/m ³	< 0.005 ± 0.0030	0.0 – 0.00025	No
gamma-BHC (Lindane) g/m ³	< 0.005 ± 0.0030	0.0 – 0.00025	No
Bis(2-chloroethoxy) methane g/m ³	< 0.005 ± 0.0025	0.0 – 0.00025	No

blank PrepWS xwSVasc - Semivolatile Water Analysis: 4898.1

		Results	Control Limits	Outside Limit (Yes/No)
Bis(2-chloroethyl)ether	g/m ³	< 0.005 ± 0.0025	0.0 – 0.00025	No
Bis(2-chloroisopropyl)ether	g/m ³	< 0.005 ± 0.0027	0.0 – 0.00025	No
Bis(2-ethylhexyl)phthalate	g/m ³	< 0.03 ± 0.015	0.0 – 0.00100	No
4-Bromophenyl phenyl ether	g/m ³	< 0.005 ± 0.0027	0.0 – 0.00025	No
Butylbenzylphthalate	g/m ³	< 0.010 ± 0.0054	0.0 – 0.00050	No
Carbazole	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
4-Chloro-3-methylphenol	g/m ³	< 0.010 ± 0.0056	0.0 – 0.00050	No
1&2-Chloronaphthalene	g/m ³	< 0.003 ± 0.00088	0.0 – 0.00050	No
2-Chlorophenol	g/m ³	< 0.005 ± 0.0028	0.0 – 0.00025	No
4-Chlorophenyl phenyl ether	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
Chrysene	g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
4,4'-DDD	g/m ³	< 0.005 ± 0.0025	0.0 – 0.00025	No
4,4'-DDE	g/m ³	< 0.005 ± 0.0027	0.0 – 0.00025	No
4,4'-DDT	g/m ³	< 0.010 ± 0.0048	0.0 – 0.00050	No
Di(2-ethylhexyl)adipate	g/m ³	< 0.005 ± 0.0030	0.0 – 0.00025	No
Dibenzo[a,h]anthracene	g/m ³	< 0.003 ± 0.0012	0.0 – 0.00025	No
Dibenzofuran	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
1,2-Dichlorobenzene	g/m ³	< 0.010 ± 0.0054	0.0 – 0.00050	No
1,3-Dichlorobenzene	g/m ³	< 0.010 ± 0.0052	0.0 – 0.00050	No
1,4-Dichlorobenzene	g/m ³	< 0.010 ± 0.0046	0.0 – 0.00050	No
2,4-Dichlorophenol	g/m ³	< 0.005 ± 0.0028	0.0 – 0.00025	No
Dieldrin	g/m ³	< 0.005 ± 0.0027	0.0 – 0.00025	No
Diethylphthalate	g/m ³	< 0.010 ± 0.0053	0.0 – 0.00050	No
2,4-Dimethylphenol	g/m ³	< 0.005 ± 0.0014	0.0 – 0.00025	No
Dimethylphthalate	g/m ³	< 0.010 ± 0.0055	0.0 – 0.00050	No
Di-n-butylphthalate	g/m ³	< 0.010 ± 0.0056	0.0 – 0.00100	No
2,4-Dinitrotoluene	g/m ³	< 0.010 ± 0.0057	0.0 – 0.00050	No
2,6-Dinitrotoluene	g/m ³	< 0.010 ± 0.0055	0.0 – 0.00050	No
Di-n-octylphthalate	g/m ³	< 0.010 ± 0.0031	0.0 – 0.00050	No
Endosulfan I	g/m ³	< 0.010 ± 0.0049	0.0 – 0.00050	No
Endosulfan II	g/m ³	< 0.010 ± 0.0057	0.0 – 0.00050	No
Endosulfan sulphate	g/m ³	< 0.010 ± 0.0049	0.0 – 0.00050	No
Endrin	g/m ³	< 0.010 ± 0.0050	0.0 – 0.00050	No
Endrin ketone	g/m ³	< 0.010 ± 0.0053	0.0 – 0.00050	No
Fluoranthene	g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Fluorene	g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Heptachlor	g/m ³	< 0.005 ± 0.0027	0.0 – 0.00025	No
Heptachlor epoxide	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
Hexachlorobenzene	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
Hexachlorobutadiene	g/m ³	< 0.010 ± 0.0056	0.0 – 0.00050	No
Hexachloroethane	g/m ³	< 0.010 ± 0.0041	0.0 – 0.00050	No
Indeno(1,2,3-c,d)pyrene	g/m ³	< 0.003 ± 0.00074	0.0 – 0.00025	No
Isophorone	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
2-Methylnaphthalene	g/m ³	< 0.003 ± 0.0016	0.0 – 0.000125	No
3 & 4-Methylphenol (m- + p-cresol)	g/m ³	< 0.010 ± 0.0043	0.0 – 0.00050	No

blank PrepWS xwSVasc - Semivolatile Water Analysis: 4898.1

		Results	Control Limits	Outside Limit (Yes/No)
2-Methylphenol (o-Cresol)	g/m ³	< 0.005 ± 0.0021	0.0 – 0.00025	No
Naphthalene	g/m ³	< 0.003 ± 0.0016	0.0 – 0.000125	No
Nitrobenzene	g/m ³	< 0.005 ± 0.0026	0.0 – 0.00025	No
2-Nitrophenol	g/m ³	< 0.010 ± 0.0051	0.0 – 0.00050	No
N-Nitrosodi-n-propylamine	g/m ³	< 0.010 ± 0.0055	0.0 – 0.00050	No
N-Nitrosodiphenylamine + Diphenylamine	g/m ³	< 0.010 ± 0.0028	0.0 – 0.00050	No
Pentachlorophenol (PCP)	g/m ³	< 0.10 ± 0.048	0.0 – 0.0050	No
Phenanthrene	g/m ³	< 0.003 ± 0.0017	0.0 – 0.000125	No
Phenol	g/m ³	< 0.010 ± 0.0050	0.0 – 0.00050	No
Pyrene	g/m ³	< 0.003 ± 0.0016	0.0 – 0.000125	No
1,2,4-Trichlorobenzene	g/m ³	< 0.005 ± 0.0029	0.0 – 0.00025	No
2,4,5-Trichlorophenol	g/m ³	< 0.010 ± 0.0050	0.0 – 0.00050	No
2,4,6-Trichlorophenol	g/m ³	< 0.010 ± 0.0045	0.0 – 0.00050	No

Fluid 3 Blank (glass) PrepWS SPLP PrepWS xwIPAHC - Polycyclic Aromatic Hydrocarbon Water Analysis: 5584.3

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene	g/m ³	< 0.00010 ± 0.000045	0.0 – 0.000100	No
Acenaphthylene	g/m ³	< 0.00010 ± 0.000040	0.0 – 0.000100	No
Anthracene	g/m ³	< 0.00010 ± 0.000057	0.0 – 0.000100	No
Benzo[a]anthracene	g/m ³	< 0.00010 ± 0.000059	0.0 – 0.000100	No
Benzo[a]pyrene (BAP)	g/m ³	< 0.00010 ± 0.000047	0.0 – 0.000100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	g/m ³	< 0.00010 ± 0.000047	0.0 – 0.000100	No
Benzo[g,h,i]perylene	g/m ³	< 0.00010 ± 0.000042	0.0 – 0.000100	No
Benzo[k]fluoranthene	g/m ³	< 0.00010 ± 0.000051	0.0 – 0.000100	No
Chrysene	g/m ³	< 0.00010 ± 0.000057	0.0 – 0.000100	No
Dibenzo[a,h]anthracene	g/m ³	< 0.00010 ± 0.000042	0.0 – 0.000100	No
Fluoranthene	g/m ³	< 0.00010 ± 0.000062	0.0 – 0.000100	No
Fluorene	g/m ³	< 0.0002 ± 0.000051	0.0 – 0.000100	No
Indeno(1,2,3-c,d)pyrene	g/m ³	< 0.00010 ± 0.000042	0.0 – 0.000100	No
Naphthalene	g/m ³	< 0.0005 ± 0.00014	0.0 – 0.00050	No
Phenanthrene	g/m ³	< 0.0004 ± 0.000061	0.0 – 0.000100	No
Pyrene	g/m ³	< 0.0002 ± 0.000054	0.0 – 0.000100	No

QC Spike QCs

LCS PrepWS xwTPH - WS: Total Petroleum Hydrocarbons Water Analysis: 8575.3

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	104 ± 32	70 – 130	No

LCS PrepWS xwSVasc - Semivolatile Water Analysis: 4898.2

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene	%	75 ± 28	40 – 130	No
Acenaphthylene	%	79 ± 30	40 – 130	No
Aldrin	%	69 ± 25	40 – 130	No
Anthracene	%	74 ± 28	40 – 130	No
Benzo[a]anthracene	%	89 ± 33	40 – 130	No
Benzo[a]pyrene (BAP)	%	77 ± 46	40 – 130	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	75 ± 40	40 – 130	No
Benzo[g,h,i]perylene	%	86 ± 50	40 – 130	No

LCS PrepWS xwSVasc - Semivolatile Water Analysis: 4898.2

		Results	Control Limits	Outside Limit (Yes/No)
Benzo[k]fluoranthene	%	78 ± 43	40 – 130	No
Benzyl alcohol	%	70 ± 41	40 – 130	No
alpha-BHC	%	76 ± 25	40 – 130	No
beta-BHC	%	77 ± 22	40 – 130	No
delta-BHC	%	81 ± 25	40 – 130	No
gamma-BHC (Lindane)	%	74 ± 23	40 – 130	No
Bis(2-chloroethoxy) methane	%	74 ± 34	40 – 130	No
Bis(2-chloroethyl)ether	%	75 ± 35	40 – 130	No
Bis(2-chloroisopropyl)ether	%	75 ± 30	40 – 130	No
Bis(2-ethylhexyl)phthalate	%	95 ± 45	40 – 130	No
4-Bromophenyl phenyl ether	%	77 ± 31	40 – 130	No
Butylbenzylphthalate	%	91 ± 37	40 – 130	No
Carbazole	%	90 ± 32	40 – 130	No
4-Chloro-3-methylphenol	%	70 ± 27	40 – 130	No
2-Chlorophenol	%	76 ± 28	40 – 130	No
4-Chlorophenyl phenyl ether	%	85 ± 30	40 – 130	No
Chrysene	%	99 ± 38	40 – 130	No
4,4'-DDD	%	100 ± 46	40 – 130	No
4,4'-DDE	%	95 ± 39	40 – 130	No
4,4'-DDT	%	95 ± 45	40 – 130	No
Dibenzo[a,h]anthracene	%	87 ± 48	40 – 130	No
Dibenzofuran	%	84 ± 28	40 – 130	No
1,2-Dichlorobenzene	%	76 ± 31	40 – 130	No
1,3-Dichlorobenzene	%	76 ± 32	40 – 130	No
1,4-Dichlorobenzene	%	77 ± 38	40 – 130	No
2,4-Dichlorophenol	%	76 ± 29	40 – 130	No
Dieldrin	%	105 ± 43	40 – 130	No
Diethylphthalate	%	84 ± 35	40 – 130	No
2,4-Dimethylphenol	%	36 ± 22	40 – 130	Yes #1
Dimethylphthalate	%	82 ± 32	40 – 130	No
Di-n-butylphthalate	%	86 ± 32	40 – 130	No
2,4-Dinitrotoluene	%	82 ± 29	40 – 130	No
2,6-Dinitrotoluene	%	83 ± 32	40 – 130	No
Di-n-octylphthalate	%	87 ± 52	40 – 130	No
Endosulfan I	%	81 ± 38	40 – 130	No
Endosulfan II	%	90 ± 33	40 – 130	No
Endosulfan sulphate	%	110 ± 50	40 – 130	No
Endrin	%	101 ± 45	40 – 130	No
Endrin ketone	%	98 ± 41	40 – 130	No
Fluoranthene	%	80 ± 29	40 – 130	No
Fluorene	%	83 ± 31	40 – 130	No
Heptachlor	%	76 ± 32	40 – 130	No
Heptachlor epoxide	%	86 ± 31	40 – 130	No
Hexachlorobenzene	%	77 ± 28	40 – 130	No
Hexachlorobutadiene	%	78 ± 30	40 – 130	No

LCS PrepWS xwSVasc - Semivolatile Water Analysis: 4898.2

		Results	Control Limits	Outside Limit (Yes/No)
Hexachloroethane	%	77 ± 41	40 – 130	No
Indeno(1,2,3-c,d)pyrene	%	86 ± 54	40 – 130	No
Isophorone	%	69 ± 25	40 – 130	No
2-Methylnaphthalene	%	74 ± 31	40 – 130	No
3 & 4-Methylphenol (m- + p-cresol)	%	60 ± 31	40 – 130	No
2-Methylphenol (o-Cresol)	%	67 ± 36	40 – 130	No
Naphthalene	%	77 ± 33	40 – 130	No
Nitrobenzene	%	80 ± 35	40 – 130	No
2-Nitrophenol	%	72 ± 32	40 – 130	No
N-Nitrosodi-n-propylamine	%	72 ± 28	40 – 130	No
N-Nitrosodiphenylamine + Diphenylamine	%	64 ± 39	40 – 130	No
Phenanthrene	%	74 ± 27	40 – 130	No
Phenol	%	67 ± 31	40 – 130	No
Pyrene	%	90 ± 38	40 – 130	No
1,2,4-Trichlorobenzene	%	82 ± 29	40 – 130	No
2,4,5-Trichlorophenol	%	76 ± 34	40 – 130	No
2,4,6-Trichlorophenol	%	75 ± 37	40 – 130	No

LCS PAH PrepWS xwIPAHC - Polycyclic Aromatic Hydrocarbon Water Analysis: 5584.2

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene	%	115 ± 58	70 – 130	No
Acenaphthylene	%	114 ± 62	70 – 130	No
Anthracene	%	126 ± 46	70 – 130	No
Benzo[a]anthracene	%	112 ± 36	70 – 130	No
Benzo[a]pyrene (BAP)	%	120 ± 58	70 – 130	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	109 ± 53	70 – 130	No
Benzo[g,h,i]perylene	%	113 ± 59	70 – 130	No
Benzo[k]fluoranthene	%	116 ± 52	70 – 130	No
Chrysene	%	111 ± 40	70 – 130	No
Dibenzo[a,h]anthracene	%	119 ± 62	70 – 130	No
Fluoranthene	%	117 ± 31	70 – 130	No
Fluorene	%	117 ± 52	70 – 130	No
Indeno(1,2,3-c,d)pyrene	%	106 ± 56	70 – 130	No
Naphthalene	%	95 ± 63	70 – 130	No
Phenanthrene	%	118 ± 36	70 – 130	No
Pyrene	%	126 ± 51	70 – 130	No

Sample Spike QCs
sample spike PrepWS xwTPH - WS: Total Petroleum Hydrocarbons Water Analysis: 8575.19

		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	104 ± 32	70 – 130	No

Sample Spike PAH PrepWS xwIPAHC - Polycyclic Aromatic Hydrocarbon Water Analysis: 5584.10

		Results	Control Limits	Outside Limit (Yes/No)
Acenaphthene	%	118 ± 60	70 – 130	No
Acenaphthylene	%	109 ± 59	70 – 130	No
Anthracene	%	128 ± 47	70 – 130	No
Benzo[a]anthracene	%	114 ± 37	70 – 130	No

Sample Spike PAH PrepWS xwIIPAHsc - Polycyclic Aromatic Hydrocarbon Water Analysis: 5584.10				
		Results	Control Limits	Outside Limit (Yes/No)
Benzo[a]pyrene (BAP)	%	125 ± 61	70 – 130	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	113 ± 55	70 – 130	No
Benzo[g,h,i]perylene	%	112 ± 59	70 – 130	No
Benzo[k]fluoranthene	%	121 ± 54	70 – 130	No
Chrysene	%	115 ± 42	70 – 130	No
Dibenzo[a,h]anthracene	%	120 ± 63	70 – 130	No
Fluoranthene	%	119 ± 31	70 – 130	No
Fluorene	%	117 ± 52	70 – 130	No
Indeno(1,2,3-c,d)pyrene	%	108 ± 57	70 – 130	No
Naphthalene	%	68 ± 45	70 – 130	Yes #2
Phenanthrene	%	120 ± 37	70 – 130	No
Pyrene	%	130 ± 53	70 – 130	No

Reference Material QCs

Solids QC - Suspended Solids, Total: 23201.3

	Results	Control Limits	Outside Limit (Yes/No)
Total Suspended Solids g/m ³	1,930 ± 280	1,600 – 2,400	No

Solids QC - Suspended Solids, Total: 23213.3

	Results	Control Limits	Outside Limit (Yes/No)
Total Suspended Solids g/m ³	2,020 ± 290	1,600 – 2,400	No

Analyst's Comments

#1 The Laboratory Control Spike (LCS) recovery for this analyte was below the acceptable recovery range of the method. The corresponding sample result was accepted because the rest of the targets in the LCS were within the expected ranges. There were no phenolic target positives detected in the sample.

#2 The sample spike recovery was outside the acceptable recovery range for this analyte due to elevated incurred target compounds in the sample.

Quality Assurance Report

Page 1 of 5

Client:	Aurecon New Zealand Limited	Lab No:	3683703	QCPv1
Contact:	Tiana Hill	Date Received:	01-Oct-2024	
	C/- Aurecon New Zealand Limited	Date Reported:	04-Oct-2024	
	PO Box 9762	Quote No:	126272	
	Newmarket	Order No:		
	Auckland 1149	Client Reference:	521290-064	
		Submitted By:	Tiana Hill	

Sample Specific QCs

Polycyclic Aromatic Hydrocarbons Screening in Soil

		3683703.5	Control Limits	Outside Limit (Yes/No)
1-methylnaphthalene-d10	%	84	65 – 130	No
Benzo[a]pyrene-d12	%	89	70 – 140	No
Fluoranthene-d10	%	87	66 – 130	No

Blank QCs

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.30

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16336.1

		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
2-Methylnaphthalene	mg/kg dry wt	< 0.010 ± 0.032	0.0 – 0.0100	No
Acenaphthylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Acenaphthene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Anthracene	mg/kg dry wt	< 0.010 ± 0.0060	0.0 – 0.0100	No
Benzo[a]anthracene	mg/kg dry wt	< 0.010 ± 0.0062	0.0 – 0.0100	No
Benzo[a]pyrene (BAP)	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0065	0.0 – 0.0100	No
Benzo[e]pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Blank 1 PrepWS xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16336.1

		Results	Control Limits	Outside Limit (Yes/No)
Benzo[g,h,i]perylene	mg/kg dry wt	< 0.010 ± 0.0064	0.0 – 0.0100	No
Benzo[k]fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Chrysene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Dibenzo[a,h]anthracene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluoranthene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Fluorene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Indeno(1,2,3-c,d)pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Naphthalene	mg/kg dry wt	< 0.05 ± 0.031	0.0 – 0.050	No
Perylene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Phenanthrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No
Pyrene	mg/kg dry wt	< 0.010 ± 0.0066	0.0 – 0.0100	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.29

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

50x Manual Dilution Digest Blank PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.61

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.16

		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No

Digest Blank 1 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.16				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

Digest Blank 2 PrepWS esDig - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.32				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Cadmium	mg/kg dry wt	< 0.10 ± 0.066	-0.100 – 0.100	No
Total Recoverable Chromium	mg/kg dry wt	< 2 ± 1.3	-2.0 – 2.0	No
Total Recoverable Copper	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Lead	mg/kg dry wt	< 0.4 ± 0.26	-0.40 – 0.40	No
Total Recoverable Nickel	mg/kg dry wt	< 2 ± 1.4	-2.0 – 2.0	No
Total Recoverable Zinc	mg/kg dry wt	< 4 ± 2.7	-4.0 – 4.0	No

QC Spike QCs				
LCS TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14307.3				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	90 ± 43	70 – 130	No

LCS OC/PAH xsSHOC - WS: Polycyclic Aromatic Hydrocarbons Soil Analysis: 16336.2				
		Results	Control Limits	Outside Limit (Yes/No)
1-Methylnaphthalene	%	84 ± 21	78 – 122	No
2-Methylnaphthalene	%	81 ± 20	72 – 117	No
Acenaphthylene	%	97.0 ± 8.8	75 – 118	No
Acenaphthene	%	98 ± 28	84 – 119	No
Anthracene	%	98 ± 30	79 – 121	No
Benzo[a]anthracene	%	99 ± 26	81 – 123	No
Benzo[a]pyrene (BAP)	%	98.0 ± 7.5	76 – 123	No
Benzo[b]fluoranthene + Benzo[j]fluoranthene	%	97 ± 20	80 – 121	No
Benzo[e]pyrene	%	85.0 ± 6.5	78 – 110	No
Benzo[g,h,i]perylene	%	101 ± 18	80 – 124	No
Benzo[k]fluoranthene	%	95 ± 12	79 – 121	No
Chrysene	%	92 ± 14	83 – 121	No
Dibenzo[a,h]anthracene	%	99 ± 13	78 – 124	No
Fluoranthene	%	95.0 ± 9.6	81 – 122	No
Fluorene	%	100 ± 12	86 – 122	No
Indeno(1,2,3-c,d)pyrene	%	96.0 ± 8.9	83 – 123	No
Naphthalene	%	95 ± 24	84 – 118	No
Perylene	%	85.0 ± 6.5	76 – 107	No
Phenanthrene	%	94 ± 14	84 – 120	No
Pyrene	%	97 ± 13	79 – 123	No

Sample Spike QCs				
Matrix Spike TPH PrepWS xsSHOC - Total Petroleum Hydrocarbon Soil Analysis: 14307.24				
		Results	Control Limits	Outside Limit (Yes/No)
Total hydrocarbons (C7 - C36)	%	90 ± 43	70 – 130	No

Reference Material QCs				
SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.9 ± 2.1	9.3 – 12.9	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Cadmium	mg/kg dry wt	0.86 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.8 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.2 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.6 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.5 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	198 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11080.47				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	12.7 ± 2.3	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.92 ± 0.15	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	30.9 ± 5.0	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	14.7 ± 2.4	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	36.6 ± 5.5	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	15.7 ± 2.4	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	217 ± 16	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.2 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.83 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	26.0 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.1 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	32.2 ± 4.9	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	14.3 ± 2.3	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	194 ± 14	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.37				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	10.3 ± 2.1	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.80 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.9 ± 4.3	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.4 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	31.4 ± 4.8	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.3 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	196 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11082.62				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	9.8 ± 2.0	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.77 ± 0.13	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	24.2 ± 4.0	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	12.1 ± 2.2	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	29.7 ± 4.5	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.1 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	180 ± 13	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.5 ± 2.2	9.3 – 12.9	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.17				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Cadmium	mg/kg dry wt	0.83 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	25.5 ± 4.2	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.1 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	34.8 ± 5.3	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.7 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	197 ± 15	171 – 230	No

SETOC-705 QC - WS: High Volume Environmental Soils by ICP-MS (HVesTR): 11083.49				
		Results	Control Limits	Outside Limit (Yes/No)
Total Recoverable Arsenic	mg/kg dry wt	11.5 ± 2.2	9.3 – 12.9	No
Total Recoverable Cadmium	mg/kg dry wt	0.85 ± 0.14	0.72 – 0.99	No
Total Recoverable Chromium	mg/kg dry wt	27.1 ± 4.4	21 – 32	No
Total Recoverable Copper	mg/kg dry wt	13.8 ± 2.3	11.6 – 15.3	No
Total Recoverable Lead	mg/kg dry wt	33.7 ± 5.1	29 – 38	No
Total Recoverable Nickel	mg/kg dry wt	13.6 ± 2.2	11.6 – 17.1	No
Total Recoverable Zinc	mg/kg dry wt	199 ± 15	171 – 230	No