

6 May 2021

Kate Madsen Paua Planning 178 Bawden Road, R. D. 2 Penrose, Auckland 1061

Dear Kate,

Subject: Soil Sampling Assessment –Sub-soils Fill Area 3 (FA3)

Background and Context

EHS Support New Zealand Ltd (EHS Support) was engaged by Paua Planning Limited (Paua Planning) on behalf of Glesson Managed Fill Limited to complete sampling of the sub-surface soils at Fill Area 3 of the proposed Huntly manged fill ('the site'). Waikato Regional Council has raised concerns regarding the potential present of coal mine tailings and overburden material beneath Fill Area 3 which could potentially contaminate the shallow groundwater in the vicinity of Fill Area 3. Paua Planning has also requested EHS Support to verify if any of the material excavated from beneath Fill Area 3 would meet the proposed waste acceptance criteria for the proposed Huntly managed fill.

The work was completed in accordance with our proposal dated 1 April 2021 and this letter presents the findings of the testing and discusses the results of the investigation.

Soil Sampling and Analysis

EHS Support attended the site on 7 April 2021 and undertook the following:

- Three boreholes (HQHA1, HQHA3 and HQHA4) were advanced to 3 m below ground level (bgl) using a 50mm hand auger. The sampling equipment was washed with a solution of Decon-90[®] detergent and water between sample locations. Sample locations are shown on Figure 1.
- At each borehole location, a representative sample was collected from the recovered core from 1m, 2m and 3 m bgl using a new pair of nitrile gloves. Each sample was placed directly into a laboratory supplied glass jar.
- At sample location HQHA2 and HQHA5, samples were collected from the side walls of an open drainage trench which is approximately 3 m deep and 3 m wide. Samples were collected from 1m, 2m and 3 m bgl depth interval using a decontaminated shovel and gloved hands.
- Soil samples (including one replicate pair) were submitted to Analytica Laboratories Limited under chain of custody conditions for analysis of selected heavy elements (aluminium, arsenic, boron, cobalt, copper, lead, nickel, thallium and zinc). Selected samples were further tested using the synthetic precipitation leaching procedure (SPLP) for the same suite of heavy elements.
- The SPLP testing undertaken on the samples is designed to simulate the maximum about of inorganic elements that could be leached from the soil via natural rainfall.
- Selected samples collected from geotechnical investigation boreholes BH301 and BH302 were analysed for heavy elements and leachable metals.

Figure 1 (Attachment B) shows the sample locations.



Results

In general, soil comprised silty CLAY / clayey SILT to approximately 3 m bgl at sample location HQHA1 through HQHA5. Coal fragments/pieces were noted in soil recovered from location HQHA2 through HQHA5. Borehole logs and sample location plans are presented in Attachment B.

Analytical results are summarised in Table 1 and 2 (in Attachment C). The laboratory reports are provided in Attachment D. Results have been compared with the following assessment criteria:

- Background concentrations for selected elements in soil of the Waikato region.
- Proposed waste acceptance criteria for the Huntly Managed fill (PDP Ltd, 2020).
- Waste acceptance criteria for Class B landfill ((MfE, 2004).
- Australian & New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)

In summary, the current investigation results show that:

- Concentrations of most inorganic elements (arsenic, copper, lead, mercury, and nickel) detected in some of the analysed samples were below the published background concentrations for the Waikato Region.
- Concentrations of boron and zinc were elevated above Waikato Regional background levels in some samples.
- Soil concentrations do vary between sampling locations.
- All the reported inorganic element concentrations were below the proposed waste acceptance criteria for the Huntly Managed fill except for boron in samples collected from location HQHA2. However, the calculated 95% upper confidence level of the mean for boron is 29.43 mg/kg which is within the proposed waste acceptance criterion of 45 mg/kg. It is recommended that if material from around sampling location HQHA2 is to be deposited within the managed fill then additional SPLP testing for boron is undertaken¹.
- Concentrations of leachable aluminium in sample HA1-3.0, BH301-1.5m, BH301-10.0m and BH302-1.0m were above the waste acceptance criteria for Class B landfill. However, this may be due to the presence of colloids clay particles.
- Additionally, some of the leachable heavy elements were detected above the ANZG guideline levels for 80% ecosystem protection.

Conclusion and recommendation

The current investigation results show that the sub-soils from beneath Fill Area 3 are likely to meet the proposed waste acceptance criteria for the proposed Huntly Managed Fill. However, additional soil testing (for As, B, Cu, Pb, Ni, Tl and Zn) and SPLP testing for boron may need to be undertaken at a rate of one sample per 1,000 m³ (as per the proposed consent requirement (AUTH141283.03.01)). As the number of test required will depend on where and how much material is to be excavated. Some of the results within this report can be used to verify compliance with the consent requirements if the samples have been collected in the material being excavated. Gleeson Managed

¹ At this stage it is not possible to actually predicted the water quality from the soil sub drains as water from different areas could have very different chemical composition and the composition will change over time. Therefore, this water will be collected a water treatment pond or tank and tested to determine level of treatment required.



Fill Limited will then need to calculate if additional sampling will be required to meet the consent conditions.

The elevated concentrations of boron and zinc and SPLP testing (which may over predictive the final concentration of inorganic elements in the groundwater discharged from the sub-soil drains) indicates that there is the potential for the groundwater to have elevated concentrations of certain inorganic elements (particularly boron and zinc). Therefore, EHS Support recommends that the discharge from these drains is not directly discharged into the small stream to the north and east of Fill Area 3. Instead, it is recommended that the water from the sub-soil drains is collected and diverted for storage and testing into a treatment pond (or tank). Once the water has been tested to determine the actual water quality then a decision can be made to either discharge the water into the stormwater retention pond for treatment or removed for off-site treatment and disposal.

The water quality management plan will need to be updated to including:

- Frequency and type of testing required.
- Trigger levels for determining level of treatment required of water from the sub-soil drains.
- Decision tree outlying various management options for treatment of the water.

Should you have any questions or require additional information, please feel free to contact me at 021 295 2284.

Sincerely,

Andrew Rumsby

Andrew Rumsby Principal Environmental Chemist



Appendix A – Statement of Limitations

EHS Support New Zealand Limited ("EHS Support") has prepared this document in accordance with the usual care and thoroughness of the consulting profession for the use of Paua Planning Limited and only those third parties who have been authorised in writing by EHS Support to rely on this document. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this document. It is prepared in accordance with the scope of work and for the purpose outlined in EHS Support email proposal to Paua Planning dated 1 April 2021 and the terms and conditions outlined the Short Form Agreement for Consultant Engagement dated 21 September 2020.

The methodology adopted and sources of information used by EHS Support are outlined in this document. EHS Support has made no independent verification of this information beyond the agreed scope of works and EHS Support assumes no responsibility for any inaccuracies or omissions. No indications were found during the preparation of this document that information contained in this document as provided to EHS Support was false.

This document was prepared on the issue date and is based on the information available at the time of preparation. EHS Support disclaims responsibility for any changes that may have occurred after this time.

This document should be read in full. No responsibility is accepted for use of any part of this document in any other context or for any other purpose or by third parties. This document does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this document, EHS Support must be notified of any such findings and be provided with an opportunity to review the recommendations of this document.

Whilst to the best of our knowledge information contained in this document is accurate at the date of issue, subsurface conditions, including groundwater levels can change in a limited time. Therefore, this document and the information contained herein should only be regarded as valid at the time of writing, unless otherwise explicitly stated in this document.



Attachment B – Borehole Logs and Sample Location Plan





Project: Huntly Quarry - Disposal Site Fill # 3

Excavation Date: 7 April 2021

Excavation method: Hand auger

Total depth: 3 m bgl

Hand Auger Hole ID: HQHA1

Comments:			Logged by: JH Checked by: AR
Soil Samples	Depth (m)	Soil Description	Well Construction
HA1 0-0.1	-	TOPSOIL, SILT with some rootlets, brown, moist, soft	
		CLAY with some silt, light brown with orange mottling, dry, firm	
	—0.5	CLAY with some silt, brown, dry, firm	
	-	SILT with some clay, dark grey, stiff	
HA1-1.0	- - 1	water seeping in from 0.8 m bgl	
	_		
	- - 1.5		
	-		
HA1-2.0	- 2		
	- - -		
	- 2.5 -		
	-	become wet and soft from 2.7 m	
HA1-3.0		End of hole 3 m bgl.	
	- —3.5		
	_		
	4 _		
	-		
	- 4.5		
	_		
	_		



Hand Auger Hole ID: HQHA2

Project: Huntly Quarry - Disposal Site Fill # 3

Excavation Date: 7 April 2021

Excavation method: NA

Total depth: 3 m bgl

Comments: samples collected from open trench dug for geotechnical investigation Logged by: JH Checked by: AR Depth (m) Soil Samples Soil Description Well Construction HA2 0-0.1 FILL, silty CLAY with rock pieces up to 15 cm diameter and coal fragments, brown, stiff 0.5 HA2-1.0 1 1.5 -2 HA2-2.0 2.5 Wet from 2.8 m HA2-3.0 / 3 End of hole 3 m bgl. DUPA 3.5 .4 -4.5



Project: Huntly Quarry - Disposal Site Fill # 3

Excavation Date: 7 April 2021

Excavation method: Hand auger

Total depth: 3 m bgl

Hand Auger Hole ID: HQHA3

Comments:	_		Logged by: JH Checked by: AR
Soil Samples	Depth (m)	Soil Description	Well Construction
HA3 0-0.1		TOPSOIL, SILT with some rootlets, dark brown, dry, soft	
	- - 0.5	CLAY with some silt, brown mottled orange brown, dry, firm	
HA3-1.0	- - 	SILT with some clay, dark grey, dry, firm/stiff	
	_ 1.5 _ _		
HA3-2.0	2 		
	2.5 	SILT with some clay and some small coal fragments, wet, soft	
HA3-3.0	<u>3</u> - - - - - - - - - - - - - - - - - - -	End of hole 3 m bgl.	



Project Number:

Project: Huntly Quarry - Disposal Site Fill # 3

Excavation Date: 7 April 2021

Excavation method: Hand auger

Total depth: 3 m bgl

Hand Auger Hole ID: HQHA4

Comments:

Logged	by: JH
Checked	by: AR

Soil Samples	Depth (m)	Soil Description	Well Construction
HA4 0-0.1 HA4-1.0	- - - - - - - - - - - - - 1	FILL, clay with some silt and coal fragments/pieces, orange brown, dry, firm	
	- - - 	SILT with some clay, grey, dry, very stiff	
HA4-2.0	2 2.5 	Clayey SILT, grey, moist, stiff wet from 2.6 m, soft with minor coal pieces	
HA4-3.0		End of hole 3 m bgl.	



Hand Auger Hole ID: HQHA5

Project: Huntly Quarry - Disposal Site Fill # 3

Excavation Date: 7 April 2021

Excavation method: NA

Total depth: 2.8 m bgl

Comments: samples collected from open trench dug for geotechnical investigation Logged by: JH Checked by: AR Depth (m) Soil Samples Soil Description Well Construction HA5 0-0.1 FILL, silty CLAY with rock pieces up to 15 cm diameter and coal fragments, brown, stiff 0.5 HA5-1.0 1 1.5 -2 HA5-2.0 2.5 Wet from 2.8 m HA5-3.0/ 3 End of hole 3 m bgl. DUPB 3.5 .4 -4.5

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P	ROJECT: Huntly Quarry Fill Sites										JOB N	0.: 23	25	
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SI	URVEY CIRCUIT: MTEDEN2000 D/	ATUM:	NZV	D201	6	U	WEAT	HER: Fine	2		PAGE: 1 (DF 11		~ 7
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	25 50 TCR (%)	GRAPHIC	ER SW MW HW EW	EW W MS STRENGT VS	SPT DATA	VANE SHEAR STRENGTH (kPa	NOTES, DEFECTS, SAM LABORATORY TEST RE	PLES & ESULTS	METHOD	WATER LEVEI	PIEZOMETER INSTALLATION
	Clayey SILT, with minor organic staining; light brown- orange. Stiff; low plasticity. Clayey SILT, with minor fibrous organic clasts, with trace gravel; brown, grey and black mottles. Firm; low plasticity; gravel, coarse, slightly weathered, Mudstone. Core Loss: 1.95 to 2.4m	- 1						2, 2 / 2, 2, 1, 1 N=6						
	Clayey SILT, with minor fibrous organic clasts, with trace gravel; brown, grey and black mottles. Firm; low plasticity; gravel, coarse, slightly weathered, Mudstone.	- 3		Q 100	-			2, 1 / 1, 1, 1, 0 N=3				Rotary cored	Water Level Not Measured	
	Clayey SILT, with minor fibrous organic clasts, with trace gravel; brown, grey and black mottles. Firm; low plasticity; gravel, coarse, slightly weathered, Mudstone.	- 4		ф 1ф0				4, 6 / 3, 2, 2, 2 N=9						
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s	ITE LOCATION: Huntly Quarry Fill Site - 300 River O-ORDINATES: 5838034mN, 1789392mE GF	view R	oad, RL:	Huntly 66.28	m					START	DATE: 01/ DATE: 03/	'03/20 '03/20	21 21	
s	URVEY CIRCUIT: MTEDEN2000 DA	TUM:	NZ	VD2016			WEATH	ER: Fine			PAGE: 2 C	DF 11		
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	50 50 75 TCR (%)	GRAPHIC	sw sw mw HW Ew	EW WM MS STRENGTH ES	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS, SAM LABORATORY TEST RE	PLES & SULTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
	Core Loss: 4.95 to 5.6m	-												
	Clayey SILT, with minor fibrous organic clasts, with trace gravel; brown, grey and black mottles. Firm; low plasticity; gravel, coarse, slightly weathered, Mudstone.	- - - - - - - - - - - - - - - - - - -		100				1, 1 / 1, 1, 2, 2 N=6						-
		- 7 - 7 		100 100				1, 1 / 2, 2, 1, 2 N=7				Rotary cored	Water Level Not Measured	
	Core Loss: 7.95 to 8.6m Clayey SILT, with minor fibrous organic clasts, with trace gravel; brown, grey and black mottles. Firm; low plasticity; gravel, coarse, slightly weathered, Mudstone.	- 8		0	* 5 TT									
2021 3:57:16 pm	Silty CLAY; brown and blue-grey, oxidises to light brown. Soft to firm; high plasticity.	- 9		100				0, 0 / 0, 0, 1, 1 N=2						
B Log MK TEST - 24/03/2	Core Loss: 9.45 to 9.9m	-		0										
orehole	Silty CLAY; brown and blue-grey, oxidises to light		<u> </u>	100	DATE				DEMA				Ļ	
th CORE-GS by Geroc - Br	EMARKS DGGED BY: MK HECKED BY: KCC PPROVED BY: KCC TATUS: PRELIM			<u> (EF </u>	DATE	/ IIME	LEVEL		<u>KEMA</u>	<u>Kn</u> 6	5 Carmo 5 Carmo Mt Wel Aucklan New Zo P O Box Pakur	neers nt Plac llington d 1060 ealand 51 295 ranga	s Ltd e,), 5,	
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Page 2 of 11

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GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	²⁵ 50 TCR (%)	GRAPHIC	sw ww HW EW	WW WS STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS LABORATORY TE	S, SAMPLES &	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
	brown. Soft to firm; high plasticity.			100										
	Clayey SILT, with some fibrous organics (decomposed wood fragments); light grey and light brown. Stiff; low plasticity.			100				0, 1 / 1, 1, 1, 1 N=4						
-	Clayey SILT, with tracte.20bredst 20gatNcswight tragments light brown. Stiff; low plasticity. Clayey SILT, with some sand, with trace organic inclusions and staining; dark brown, light blue-grey and	-11 - - -		Q										
	light brown. Low plasticity; sand, pumiceous .	- 12		100				0, 0 / 0, 1, 2, 2 N=5					asured	
		- - - - -13		100								Rotary corec	Water Level Not Me	
				100				0, 0 / 0, 0, 1, 1 N=2						
	Clayey sandy SILT, with trace organic staining; dark brown.	-14		100										
	Stiff; low plasticity. 14.9m - 15.1m: Some organic disseminated fibers													
RE LC CH	EMARKS DGGED BY: MK HECKED BY: KCC PPROVED BY: KCC		REF DATE / TIME LEVEL REMARK							Gaia En 5 Car Mt V Auck Nev	Gaia Engineers Ltd 5 Carmont Place, Mt Wellington Auckland 1060, New Zealand			
ST CC RI DF	TATUS: PRELIM DNTRACTOR: Drill Force G: Tractor RILLER: Conan		LOGGED IN ACCORDANCE WITH NEW ZEALAND GEOTECHNICAL SOCIETY GUIDELINES (2005)						P O E Pa Auck Nev info@gaia-	P O Box 51 295, Pakuranga Auckland 2140, New Zealand info@gaia-engineers.co.nz				

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GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	50 50 75 TCR (%)	GRAPHIC	FR SW MW HW EW	EW WW MS STRENGTH ES EX	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS, SA LABORATORY TEST	MPLES & RESULTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
	[CONT] Clayey sandy SILT, with trace organic staining; dark brown. Stiff; low plasticity.	- 16		100				0, 1 / 2, 1, 1, 1 N=5						
	Core Loss: 16.95 to 17.4m Clayey sandy SILT, with trace organic staining; dark brown. Stiff; low plasticity.	- 17		100 0				C=N				Rotary cored	ter Level Not Measured	
	Clayey SILT, with some gravel; brownish. Low plasticity; gravel, Sandstone. Silty CLAY; brown-orange and dark brown mottles. Stiff; low plasticity.	- 18		100				2, 3 / 2, 4, 4, 5 N=15					Wa	
016 LOG MK 1ES1 - 24/03/2021 3:27:10 pm	GRAVEL. Gravel, medium, subangular. TOPSOIL; dark brown. Core Loss: 19.5 to 19.95m	- 19 19 		100 0				2, 5 / 5, 5, 4, 3 N=17						
	EMARKS DGGED BY: MK HECKED BY: KCC PROVED BY: KCC ATUS: PRELIM DNTRACTOR: Drill Force G: Tractor	1	R	EF	DATE	<u>; ; ; ; ;</u> / TIME			REMA	RK	Gaia Engi 5 Carmo Mt We Aucklar New Z P O Box Paku Aucklar New Z	neers nt Plac llington d 1060 ealand 51 299 ranga d 2140 ealand	5, 5,	<u> </u>

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SITE LOCATION:	Huntly Quarry Fill Site - 300 Rive	rview Ro	bad,	Huntly					START DATE: 01/03/2021 END DATE: 03/03/2021					
CO-ORDINATES: 5	838034mN, 1789392mE G	ROUND ∆TUM∙	RL:	66.28 10201/	m		WFATI	IFR: Fine			END DATE: 03/ PAGE: 5 (/03/20)F 11	21	
(See Classificat	RIAL DESCRIPTION	DEPTH (m) RL (m)	SAMPLE TYPE	²⁵ TCR (%)	GRAPHIC	ER SW MW HW EW	MS STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFEC LABORATORY	TS, SAMPLES & TEST RESULTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
Core Loss: 19.95 tr	o 20.9m													
GRAVEL: greyish. Gravel, medium to Completely weathe extremely weak; sa defects, non plastic	coarse, subround. red; greyish brown; SILTSTONE; ndy SILT with MnO staining on	21		100				5, 5 / 6, 4, 4, 11 N=25						
ool Measures	rodi oronogo ond lipht kroup, fing	-22		100		EW		2 4/40 17				Rotary cored	Water Level Not Measured	
fabric, thinly lamina	ted; SILTSTONE; very weak.	-23		100 0	-	₩W		2, 47 10, 17, 11, 10 N=48						
Slightly weathered; strong. EOH: 24.00m	grey ; SILTSTONE; moderately	- 24		100		Mvy		2, 8 / 50 for 60mm N=50 for 60mm						
		- - - - -												
REMARKS LOGGED BY: MK CHECKED BY: KC APPROVED BY: KC STATUS: PRELIM CONTRACTOR: D RIG: Tractor DRILLER: Conan	C CC rill Force			REF		ANCE WITH	LEVEL		REMA	RK	Gaia Engi 5 Carmo Mt We Aucklar New Z P O Box P O Box P Abu Aucklar New Z info@gaia-em	nt Plac llington d 1060 ealand 51 299 ranga d 2140 ealand gineel	s Ltd e,), 5,), rs.co.r	١z

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Page 5 of 11

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CLIENT: PROJEC	Gleeson Quarries Ltd.										JOB N	0.: 23	25	
SITE LOC CO-ORDII SURVEY	CATION: Huntly Quarry Fill Site - 300 Rive NATES: 5838065mN , 1789368mE GI CIRCUIT: MTEDEN2000 D/	rview Ro ROUND ATUM:	oad, RL: NZ\	Huntly 66.28 VD201	3 m 6		WEATH	IER: Fine		START END	DATE: 24/ DATE: 26/ PAGE: 6 C	/02/20 /02/20 DF 11	21 21	
(See	MATERIAL DESCRIPTION e Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	25 50 TCR (%) 75	GRAPHIC	WEATHERING	STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS, SAN LABORATORY TEST RI	IPLES & ESULTS	METHOD	WATER LEVEL	PIEZOMETER
TOPSO Sitty CL High pla Sitty CL High pla Sitty CL grey and Stift; low	IIL. AY; light grey and brown. asticity. AY; light grey and brown. asticity. AY, with some organic inclusions; dark brown, d black mottles. v plasticity.	- 1		58										
CLAY & grey, bl Stiff; low	SILT, with trace organic staining and sand; ue-grey and dark brown mottles. v plasticity; sand, fine.	- 2		33				1, 2 / 1, 1, 0, 1 N=3						
2.4	m - 2.4m: with some organic staining, dark grey and dark brow mottles			87 90				0, 0 / 0, 1, 1, 1 N=3				Rotary core		
Sitty CL Firm; hiş	AY; light grey and light brown-orange mottles . gh plasticity.	- - - - - - - - - - - - - - - - - - -		0 100				1, 0 / 1, 0, 1, 1 N=3						
L CHECKED CHECKED APPROVE STATUS: CONTRAC RIG: Trac	S BY: MK D BY: KCC D BY: KCC PRELIM CTOR: Drill Force ctor	1	R	REF	DATE	/ <u> </u>			REMA		Gaia Engi 5 Carmo Mt Wei Aucklan New Z P O Box Paku Aucklan New Z 0@gaia-en	neers nt Plac llington d 1060 ealand 51 299 ranga d 2140 ealand gineer	Ltd e, 5, 5, 1, rs,co.r	<u> </u>

Page 6 of 11

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C	LIENT: Gleeson Quarries Ltd.										JOB N	0.:	25	
SI	TE LOCATION: Huntly Quarry Fill Site - 300 River	view R	Road,	Huntly						STAF	RT DATE: 24	/02/20	21	
C SI	O-ORDINATES: 5838065mN , 1789368mE GF URVEY CIRCUIT: MTEDEN2000 DA	ROUNE	D RL: NZ'	65.64 VD2016	lm 6		WEATH	IER: Fine		EN	ID DATE: 26 PAGE: 7 (/02/20 DF 11	21	
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	25 50 TCR (%) 75	GRAPHIC	SW WW WW EW	EW WW MS STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS, S. LABORATORY TEST	AMPLES & RESULTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
	[CONT] Silty CLAY; light grey and light brown-orange mottles . Firm: high plasticity													
	5.3m - 5.3m: becoming dark brown-orange and dark	- - - -												
		- 6		100				2, 2 / 1, 1, 2, 1 N=5						
	Sandy SILT; dark brown with occaisional orange mottles. Stiff, low plasticity.	- 7		100										
-	Clayey SILT, with trace organic inclusions; dark brown with occaisional orange mottles. Firm; high plasticity.	- -		100				0, 0 / 1, 0, 0, 1 N=2				Rotary cored		
-	Clayey SILT, with some organic staining; dark brown and grey mottles. Stiff; low plasticity.	- 8		57										
		- - - 9 -		100				1, 1 / 1, 1, 2, 1 N=5						
		•		48										
RE LO CH	I EMARKS DGGED BY: MK HECKED BY: KCC PROVED BY: KCC	1	F	REF	DATE /	<u> </u> /TIME			REMA	RK	Gaia Eng 5 Carmo Mt We Aucklar New Z	ineer Int Plac Ilington d 1060 cealand	s Ltd e,),	<u>ı 1</u>
	ATUS: PRELIM DNTRACTOR: Drill Force G: Tractor RILLER: Conan		LO	OGGED I	N ACCORDA	NCE WITH	NEW ZEAL	AND GEOTECHNIC	AL SOCIET	Y GUIDELINES (2005)	P O Boy Paku Aucklar New Z info@gaia-er	51 299 ranga nd 2140 lealand iginee	5,), rs.co.i	١z

				E	BOR	REHC	LE	LOG				BH3	302	
C	LIENT: Gleeson Quarries Ltd.										JOB N	0.:	25	
P S	ROJECT: Huntly Quarry Fill Sites ITE LOCATION: Huntly Quarry Fill Site - 300 River	rview Ro	oad,	Huntly						START	 DATE: 24/	232 02/20	25 21	
C	O-ORDINATES: 5838065mN , 1789368mE GF	ROUND	RL:	65.64	m		WEAT	HER: Fine		END	DATE: 26/	02/20	21	
3			щ	VD2010	,	U Z	E		a)		FAGE. 8 C			чZ
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYF	25 50 TCR (%) 75	GRAPHIC	sw sw mw HW Ew	MS STRENG	SPT DATA	VANE SHEAR STRENGTH (kP	NOTES, DEFECTS, SAM LABORATORY TEST RE	PLES & SULTS	METHOD	WATER LEVE	PIEZOMETE INSTALLATIO
	[CONT] Clayey SILT, with some organic staining; dark brown and grey mottles. Stiff; low plasticity. 10.2m - 10.2m: with trace mudstone inclusions	-		48										
-	Silty CLAY, with trace orgnanic staining and sand; dark grey brown.	- - - -11		100				0, 1 / 0, 0, 1, 1 N=2						•
	11.4m - 11.4m: trace sandy silt inclusions	- - -		140										
- - - -		- 12		100				0, 0 / 0, 2, 1, 1 N=4				Rotary cored		
-	12.9m - 12.9m: becoming light grey mottles 🛩	-13		100										
-		-14		100				0, 0 / 1, 2, 1, 2 N=6						
		·			888									
RE LC CH AF ST CC RI	EMARKS DGGED BY: MK HECKED BY: KCC PPROVED BY: KCC TATUS: PRELIM DNTRACTOR: Drill Force G: Tractor		F	REF	DATE		LEVEL		REMA	RK G	Gaia Engi 5 Carmo Mt Wel Aucklan New Zi P O Box Pakur Aucklan New Zi O@gaia-en	nt Place lington d 1060 ealand 51 295 anga d 2140 ealand ginee	s Ltd e, 5, 5, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1Z

HOLE NO .:



Generated with CORE-GS by Geroc - Borehole Log MK TEST - 24/03/2021 3:57:16 pm

				BOK	EHC)LE I	LOG				E	BH3	802	
C	CIENT: Gleeson Quarries Ltd.									J	OB NC).:	25	
s	ITE LOCATION: Huntly Quarry Fill Site - 300 Riverv	iew Ro	oad, Huntly						S.	TART DAT	E: 24/0	02/202	21	
C S	O-ORDINATES: 5838065mN , 1789368mE GR URVEY CIRCUIT: MTEDEN2000 DA	OUND TUM:	RL: 65.64	∔m 6		WEATH	IER: Fine			END DAT PAG	E: 26/0)2/202 F 11	21	
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	GRAPHIC	ww WEATHERING	EW WW STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS LABORATORY TE	5, SAMPLE ST RESUL	:S & LTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
F	[CONT] Silty CLAY, with trace orgnanic staining and sand; dark grey brown.				- 0/2 1 8		0, 0 / 2, 1, 2, 2 N=7							
	Sum to very sum; nigh plasticity; sand, tine. 15.5m - 15.5m: becoming dark grey-brown, no inclusions	-16	100				1, 2 / 3, 2, 3, 4 N=12							
	17.0m - 17.0m: becoming light grey and orange mottles, trace sandy silt inclusions	- 17										þ		
	17.4m - 17.6m: CLAY; light blue-grey and orange mottles. Firm; high plasticity.	- - -18 -	100 				4, 5 / 3, 2, 5, 5 N=15					Rotary core		
ole Log MK TEST - 2400/2021 3:57:16 pm	Silty GRAVEL. Stiff, gravel, medium to coarse, rounded to subangular, moderately weathered, Mudstone.	- 19	100				3, 5 / 5, 6, 7, 7 N=25							
	 EMARKS		REF	DATE	TIME			REMA	RK	Gaia	Enair	neers	s Ltd	
	DGGED BY: MK HECKED BY: KCC PPROVED BY: KCC TATUS: PRELIM DNTRACTOR: Drill Force									5 7 9 9	Carmon Mt Welli Auckland New Ze O Box ! Pakura Auckland	nt Place ington d 1060 ealand 51 295 anga d 2140	e, , ,	
IR seneraten	G: Tractor RILLER: Conan		LOGGED I	N ACCORDA	NCE WITH	NEW ZEALA		L SOCIET	Y GUIDELINES (2005)	info@g	New Ze aia-enç	aland gineer	s.co.r	ız

HOLE NO .:

GAIA

C	CLIENT: Gleeson Quarries Ltd.										JOB N	0.:	25	
S	ITE LOCATION: Huntly Quarry Fill Site - 300 River	view R	oad,	Huntly	,					STAR	T DATE: 24	/02/20	23	
С	O-ORDINATES: 5838065mN , 1789368mE GR	OUNE	RL:	65.64	4 m					EN	D DATE: 26	/02/20	21	
S	URVEY CIRCUIT: MTEDEN2000 DA	TUM:	NZ	VD201	6		WEATH	IER: Fine	r		PAGE: 10	OF 1'	1	
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) RL (m)	SAMPLE TYPE	25 50 TCR (%) 75	GRAPHIC	sw ww HW EW	EW WW MS STRENGTH ES ES	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS, SA LABORATORY TEST	MPLES & RESULTS	METHOD	WATER LEVEL	PIEZOMETER INSTALLATION
	CLAY & SILT, with trace gravel; dark brown, brown and orange mottles.				1333									
	Very stiff; low plasticity; gravel, coarse, Mudstone. Silty CLAY; dark grey and dark brown mottles. Very stiff; low plasticity. Slightly weathered; dark brown; fine fabric, laminated; SILTSTONE; weak. Clayey SiLT, with some gravel; dark grey and dark brown mottles.	21 21 		100				3, 4 / 5, 6, 7, 9 N=27						
	brown mottles. Hard; low plasticity; gravel, coarse, subround, slightly weathered, Mudstone. Highly weathered; dark brown; fine fabric, laminated; SILTSTONE; extremely weak. Clavey SILT, with minor coal inclusions.							2, 4 / 4, 7, 8, 7 N=26				Rotary cored		
es	Hard; non-plastic.	-23 - -		1¢0										
Waikato Coal Measur		- 24 - 24 				₽WP	Ē.	2, 3 / 5, 7, 7, 6 N=25						
D 7			 						REMA	RK I		 		
RE LC CH AF ST	EMARKS DGGED BY: MK HECKED BY: KCC PPROVED BY: KCC TATUS: PRELIM				DATE	. / TIME		<u> </u>	KEMA	<u>π</u>	Gaia Eng 5 Carmo Mt We Aucklar New Z P O Boo	ineer ont Plac Illington d 1060 Cealand	s Ltd :e,), 5,	
CC	DNTRACTOR: Drill Force										Paku Aucklar New 7	ranga nd 2140 'ealand),	
DF	RILLER: Conan		Ŀ	OGGED I	IN ACCORD	ANCE WITH	NEW ZEALA	ND GEOTECHNIC	AL SOCIET	Y GUIDELINES (2005)	nfo@gaia-er	nginee	rs.co.	٦Z

GAIA

HOLE NO.:

BH302

Z					BOR	(EH))	LE I	LOG				I	BH3	302	
C	LIENT: Gleeson Quarries Ltd.												JOB NO	D.:	25	
SI	TE LOCATION: Huntly Quarry Fill Site - 300 River	view F	Road,	Huntly							S.	TART I	DATE: 24/	02/202	21	
CC SL	D-ORDINATES: 5838065mN , 1789368mE GR JRVEY CIRCUIT: MTEDEN2000 DA		D RL: NZ	: 65.64 VD201	1 m 6			WEATH	IER: Fine			END D	DATE: 26/	02/20 OF 11	21	
GEOLOGY	MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	DEPTH (m) PI (m)	SAMPLE TYPE	о тск (%)	GRAPHIC	WEATHERING		STRENGTH	SPT DATA	VANE SHEAR STRENGTH (kPa)	NOTES, DEFECTS LABORATORY TE	, SAMI ST RE	PLES & SULTS	METHOD	NATER LEVEL	PIEZOMETER NSTALLATION
	[CONT] Highly weathered; dark brown; fine fabric, laminated; SILTSTONE; extremely weak. Clayey SILT, with minor coal inclusions. Hard; non-plastic		0,	70.0		E & ¥ E	1	EW S≤≤≊∞s≊							-	
al Measures	25.3m - 25.4m: Slightly weathered; dark grey-brown; , / laminated; CLAYSTONE; very weak.													/ cored		
Waikato Co		-				NUVY		Ŵ	5, 10 / 10, 6, 10, 12 N=38					Rotary		
	EOH: 25.95m	- -26														
		[-														
		-27														
		-														
		-28														
		-29														
20 20	MARKS GGED BY: MK ECKED BY: KCC			REF	DATE	E / TIME		LEVEL		REMA	<u>RK</u>	G	5 Carmor Mt Well	neer: nt Place lington	s Ltd _{e,}	
AP ST.	PROVED BY: KCC ATUS: PRELIM												P O Box Pakur	51 295	, 5,	
	C Tractor											info	Aucklan New Ze	d 2140 ealand	, 	17
JR	ILLER: Conan		L	OGGED I	N ACCORD	DANCE WIT	ЧH	NEW ZEALA	ND GEOTECHNIC	AL SOCIET	Y GUIDELINES (2005)	OTCH	≪yaia-en	ymeer	5.CO.I	ı∠

HOLE NO .:

GAIA



JOB NO.: 2325

BH301



0.00-6.00m



6.00-10.50m



JOB NO.: 2325





14.40-18.00m



2325



18.00-24.00m



JOB NO.: 2325



0.00-3.45m



3.45-7.50m



JOB NO.: 2325



7.50-12.00m



Page 2 of 5



JOB NO.:

2325



13.95-16.50m





JOB NO.: 2325



19.00-21.90m





2325



21.90-24.45m



Attachment C – Sample Results Table

		Table 1. T	Total Met	als in Soil	s in Manna	ged Fill Area	3 (Exisitiı	ng Soils)			
Reference	Sample Description	Sample Date	Arsenic	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
			(As)	(B)	(Cd)	(Cr)	(Cu)	(Pb)	(Hg)	(Ni)	(Zn)
							mg/kg dr	y wt			
21-15906	HA1 0-0.1	07 April 2021	14.5	11	0.031	9.4	16.8	24.7	0.11	4.2	33.5
21-15906	HA1 1.0	07 April 2021	3.7	21	0.074	8.8	21.2	17.2	0.19	12.3	77.8
21-15906	HA1 2.0	07 April 2021	3	24	0.063	8.5	19.7	16.9	0.19	7.91	77
21-15906	HA1 3.0	07 April 2021	3.6	20	0.065	8.6	19.6	15.5	0.21	8.14	86.8
21-15906	HA2 0-0.1	07 April 2021	2.2	48	0.045	9.6	15.5	13.3	0.13	6.2	34.8
21-15906	HA2 1.0	07 April 2021	2.7	68	0.068	7.9	19.4	15.4	0.16	8.77	66
21-15906	HA2 2.0	07 April 2021	3.8	37	0.064	7.7	20	16.2	0.19	9.42	75.7
21-15906	HA2 3.0	07 April 2021	3	45	0.082	8.7	20.4	23.4	0.19	10.6	77.5
21-15906	HA3 0-0.1	07 April 2021	11	12	0.031	9.7	17.1	22.3	0.095	6.27	59.7
21-15906	HA3 1.0	07 April 2021	5.2	16	0.13	8.5	26.5	18.9	0.2	12.9	76.1
21-15906	HA3 2.0	07 April 2021	3.4	22	0.092	8.4	22.8	18.7	0.2	12.4	89.3
21-15906	HA3 3.0	07 April 2021	1.6	29	0.052	8.7	19.4	17.3	0.23	7.53	75.6
21-15906	HA4 0-0.1	07 April 2021	4.9	4.4	0.043	9.5	8.96	17.1	0.11	5.1	29.9
21-15906	HA4 1.0	07 April 2021	4.9	12	0.023	9.2	21.2	19.2	0.23	3.5	36.4
21-15906	HA4 2.0	07 April 2021	3.1	22	0.048	7	16.4	14.8	0.18	6.38	57.9
21-15906	HA4 3.0	07 April 2021	2.7	18	0.11	7.8	19.9	17.1	0.18	10.4	81.1
21-15906	HA4 3.0	07 April 2021	5.1	20	0.099	9	20.5	17.1	0.19	11.1	78.4
21-15906	HA5 1.0	07 April 2021	4.6	12	0.036	11	16.7	16.9	0.23	5.77	47.4
21-15906	HA5 2.0	07 April 2021	6	11	0.042	10	18.4	21.6	0.14	8	70.3
21-15906	HA5 3.0	07 April 2021	11	16	0.015	9.1	16.5	31.1	0.2	3.5	28.8
2579454	BH301 - 1.0m	06 April 2021	< 2	< 20	< 0.10	5	20	19.1	N/A	3	66
2579454	BH301 - 1.5m	06 April 2021	2	< 20	< 0.10	6	21	16.1	N/A	8	59
2579454	BH301 - 3.0m	06 April 2021	< 2	26	< 0.10	7	20	17.2	N/A	6	55
2579454	BH301 - 6.0m	06 April 2021	< 2	22	< 0.10	5	17	15	N/A	7	54
2579455	BH301 - 8.7m	06 April 2021	3	22	0.1	5	22	15.8	N/A	7	84
2579455	BH301 - 10.0m	06 April 2021	4	< 20	< 0.10	5	34	20	N/A	3	83
2579455	BH302 - 1.0m	06 April 2021	3	< 20	< 0.10	5	19	22	N/A	15	91
2579455	BH302 - 1.8m	06 April 2021	4	< 20	< 0.10	6	23	17.7	N/A	9	86
2579455	BH302 - 3.0m	06 April 2021	6	< 20	< 0.10	5	20	17.3	N/A	7	50
2579454	BH302 - 6.0m	06 April 2021	12	< 20	< 0.10	6	20	17.8	N/A	10	92
2579454	BH302 - 7.6m	06 April 2021	7	< 20	< 0.10	5	23	11.7	N/A	< 2	15
2579454	BH302 - 10.0m	06 April 2021	13	< 20	< 0.10	9	19	23	N/A	9	55
95% UCL			6.524	29.43	0.0741	8.24	21.03	19.48	0.193	8.808	70.34
Huntly Was	ste Acceptance Criteria	3	100	45 (260)	7.5	400	325	250 (1000)	1.5	63 (320)	400 (2,000)
Waikato Ba	ackground Levels (95%)	6.8	6.7	0.22	30	25	20	0.23	7.6	53
Waikato Ba	ackground Levels (max	imum)	25	8.5	0.3	150	55	32	0.5	21	58

Highlighted Yellow:

above the proposed Huntly Managed Fill waste acceptance criteria above published 95% background concentration for the Waikato Region

Italic Bold:

above the published maximum background concentrations for the Waikato region



					10010 21								
Lab Reference	Sample Desc	Sample Date	Initial pH	Final pH	Aluminium*	Arsenic	Boron	Cobalt	Copper	Lead	Nickel	Thallium	Zinc
					g/m3	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3	g/m3
21-16875	HA1 3.0	4/7/2021	5.7	7.4	7.19	<0.005	0.5	0.0007	<0.01	<0.005	N/A	<0.002	<0.05
21-16875	HA2 0.1	4/7/2021	5.7	7.8	2.94	<0.005	0.6	0.0002	< 0.01	<0.005	N/A	<0.002	<0.05
21-16875	HA2 1.0	4/7/2021	5.7	6.8	<0.2	<0.005	0.7	0.0005	<0.01	<0.005	N/A	<0.002	<0.05
21-16875	HA3 2.0	4/7/2021	5.7	6	<0.2	<0.005	0.3	0.0728	<0.01	<0.005	N/A	<0.002	0.24
21-16875	HA4 3.0	4/7/2021	5.7	7.5	1.44	<0.005	0.3	0.0003	<0.01	<0.005	N/A	<0.002	<0.05
21-16875	HA5 3.0	4/7/2021	5.7	3.4	1.28	<0.005	<0.2	0.0189	0.02	<0.005	N/A	<0.002	0.38
2579454.13	BH301 - 1.0n	n [SPLP Extra	ct]	9	1.95	< 0.021	0.25	< 0.0042	< 0.011	0.0088	< 0.011	< 0.0011	0.044
2579454.14	BH301 - 1.5n	n [SPLP Extra	ct]	9.3	4.7	< 0.021	1.51	< 0.0042	0.014	0.0178	< 0.011	< 0.0011	0.029
2579454.15	BH301 - 3.0n	n [SPLP Extra	ct]	8.1	1.25	< 0.021	0.29	< 0.0042	< 0.011	0.0049	< 0.011	< 0.0011	< 0.021
2579454.16	BH301 - 6.0n	n [SPLP Extra	ct]	8.9	2.1	< 0.021	0.32	< 0.0042	< 0.011	0.0076	< 0.011	< 0.0011	< 0.021
2579454.17	BH301 - 8.7n	n [SPLP Extra	ct]	9.6	2.8	< 0.021	1.3	< 0.0042	< 0.011	0.0096	< 0.011	< 0.0011	0.027
2579454.18	BH301 - 10.0	m [SPLP Extr	act]	9.1	4.8	< 0.021	0.16	< 0.0042	0.027	0.0098	< 0.011	< 0.0011	0.061
2579454.19	BH302 - 1.0n	n [SPLP Extra	ct]	9.2	4.5	< 0.021	0.2	< 0.0042	< 0.011	0.008	< 0.011	< 0.0011	0.022
2579454.2	BH302 - 1.8n	n [SPLP Extra	ct]	9.3	3.8	< 0.021	0.29	< 0.0042	< 0.011	0.0043	< 0.011	< 0.0011	< 0.021
2579454.21	BH302 - 3.0n	n [SPLP Extra	ct]	7.4	0.63	< 0.021	< 0.11	0.0139	< 0.011	< 0.0021	< 0.011	< 0.0011	< 0.021
2579454.22	BH302 - 6.0n	n [SPLP Extra	ct]	8.7	3	< 0.021	0.17	< 0.0042	< 0.011	< 0.0021	< 0.011	< 0.0011	< 0.021
2579454.23	BH302 - 7.6n	n [SPLP Extra	ct]	8.7	3.9	< 0.021	< 0.11	< 0.0042	< 0.011	0.0048	< 0.011	< 0.0011	< 0.021
2579454.24	BH302 - 10.0	m [SPLP Extr	act]	9.1	3.2	< 0.021	0.13	< 0.0042	< 0.011	0.0039	< 0.011	< 0.0011	< 0.021
Huntly Waste					NGV	NGV	2	NGV	NGV	1	NGV	NGV	1
Acceptance criteria													
Class B landfill					4	0.5	2	NGV	0.5	0.5	1	NGV	1
ANZG (2018)	80%				NGV	0.36	1.3	NGV	0.0025	0.0094	0.017	NGV	0.031
ANZG (2018)	95%				0.0008	0.024	0.37	0.0014	0.0014	0.0034	0.011	0.00003	0.008

Table 2. Results of SPLP testing

above current ANZG (2018) guidelines levels for 95% ecosystem protection

above proposed ANZG (2018) guidelines levels for 95% ecosystem protection for boron

above Class B landfill acceptance criteria (source: MfE Hazardous waste Guidelines, Landfill Waste Acceptance Criteria and Landfill Classification, May 2004)





Attachment C – Laboratory Reports

7



Analytica Laboratories Limited Ruakura Research Centre 10 Bisley Road Hamilton 3214, New Zealand Ph +64 (07) 974 4740 sales@analytica.co.nz www.analytica.co.nz

Certificate of Analysis

EHS Suppo	ort New Zealand Ltd	Lab Reference:	21-16875
PO Box 15	887	Submitted by:	JH
Auckland	0604	Date Received:	14/04/2021
		Testing Initiated:	14/04/2021
Attention:	Andrew Rumsby	Date Completed:	27/04/2021
Phone:	021 1020 533	Order Number:	Huntly Q
Email:	andrew.rumsby@ehs-support.com	Reference:	Huntly Q

Sampling Site: Huntly Q

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report. Specific testing dates are available on request.

AMENDED REPORT. This report replaces in full a previous version R00 sent on 21/04/21. Amended element selection.

Trace Elements by SPLP

	Clien	t Sample ID	HA1 3.0	HA2 0.1	HA2 1.0	HA3 2.0	HA4 3.0
	Da	ite Sampled	07/04/2021	07/04/2021	07/04/2021	07/04/2021	07/04/2021
Analyte	Unit	Reporting Limit	21-16875-1	21-16875-2	21-16875-3	21-16875-4	21-16875-5
Aluminium*	g/m ³	0.2	7.19	2.94	<0.20	<0.20	1.44
Arsenic	g/m ³	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Boron	g/m ³	0.2	0.5	0.6	0.7	0.3	0.3
Cobalt	g/m³	0.0001	0.0007	0.0002	0.0005	0.0728	0.0003
Copper	g/m ³	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	g/m ³	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	g/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	g/m ³	0.05	<0.05	<0.05	<0.05	0.24	<0.05

Trace Elements by SPLP

	Client	Sample ID	HA5 3.0
	Da	te Sampled	07/04/2021
Analyte	Unit	Reporting Limit	21-16875-6
Aluminium*	g/m³	0.2	1.28
Arsenic	g/m³	0.005	<0.005
Boron	g/m ³	0.2	<0.2
Cobalt	g/m ³	0.0001	0.0189
Copper	g/m³	0.01	0.02
Lead	g/m ³	0.005	<0.005
Thallium	g/m ³	0.002	<0.002
Zinc	g/m ³	0.05	0.38

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.

PCCREDITED



Elements in Soil

	Client	t Sample ID	HA3 2.0	HA3 3.0	HA4 0-0.1	HA4 1.0	HA4 2.0
	Da	te Sampled					
Thallium	mg/kg dry wt	0.025	0.23	0.16	0.21	0.21	0.15

Elements in Soil

	Clien	t Sample ID	HA4 3.0	HA5 1.0	HA5 2.0	HA5 3.0	DUP B
	Da	ate Sampled					
Analyte	Unit	Reporting Limit	21-18868-16	21-18868-17	21-18868-18	21-18868-19	21-18868-20
Aluminium*	mg/kg dry wt	2.5	14,200	30,000	55,500	24,500	27,100
Cobalt	mg/kg dry wt	0.025	9.37	4.24	9.35	3.31	3.79
Thallium	mg/kg dry wt	0.025	0.16	0.23	0.20	0.45	0.23

Elements in Soil

	Clien	DUP A	
Analyte	Unit	Reporting Limit	21-18868-21
Aluminium*	mg/kg dry wt	2.5	11,400
Cobalt	mg/kg dry wt	0.025	9.39
Thallium	mg/kg dry wt	0.025	0.17

Method Summary

Elements in Soil

Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

in

Emily Hanna, B.Sc. Trace Elements Team Leader



Analytica Laboratories Limited Ruakura Research Centre 10 Bisley Road Hamilton 3214, New Zealand Ph +64 (07) 974 4740 sales@analytica.co.nz www.analytica.co.nz

Certificate of Analysis

EHS Suppo	ort New Zealand Ltd	Lab Reference:	21-18868
PO Box 15	887	Submitted by:	JH
Auckland	0604	Date Received:	27/04/2021
		Testing Initiated:	10/04/2021
Attention:	Andrew Rumsby	Date Completed:	30/04/2021
Phone:	0211020533	Order Number:	Huntly Q
Email:	andrew.rumsby@ehs-support.com	Reference:	Huntly Q

Sampling Site: Huntly Q

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.

Specific testing dates are available on request.

Elements in Soil

Client Sample ID			HA1 0-0.1	HA1 1.0	HA1 2.0	HA1 3.0	HA2 0-0.1
Date Sampled							
Analyte	Unit	Reporting Limit	21-18868-1	21-18868-2	21-18868-3	21-18868-4	21-18868-5
Aluminium*	mg/kg dry wt	2.5	23,300	14,300	12,200	12,200	12,600
Cobalt	mg/kg dry wt	0.025	4.26	10.6	6.92	7.19	7.03
Thallium	mg/kg dry wt	0.025	0.28	0.19	0.16	0.16	0.13

Elements in Soil

Client Sample ID			HA2 1.0	HA2 2.0	HA2 3.0	HA3 0-0.1	HA3 1.0
Date Sampled							
Analyte	Unit	Reporting Limit	21-18868-6	21-18868-7	21-18868-8	21-18868-9	21-18868-10
Aluminium*	mg/kg dry wt	2.5	12,000	14,000	13,300	24,200	15,800
Cobalt	mg/kg dry wt	0.025	9.02	8.85	9.73	8.06	14.2
Thallium	mg/kg dry wt	0.025	0.16	0.16	0.18	0.18	0.32

Elements in Soil

Client Sample ID		HA3 2.0	HA3 3.0	HA4 0-0.1	HA4 1.0	HA4 2.0	
Date Sampled							
Analyte	Unit	Reporting Limit	21-18868-11	21-18868-12	21-18868-13	21-18868-14	21-18868-15
Aluminium* mg/kg dry wt 2.5		14,700	12,900	53,500	18,400	12,400	
Cobalt	mg/kg dry wt	0.025	14.8	6.76	5.80	4.13	5.63

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation with the exception of tests marked *, which are not accredited.

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SPLP Extraction

Client Sample ID		HA1 3.0	HA2 0.1	HA2 1.0	HA3 2.0	HA4 3.0	
Date Sampled		07/04/2021	07/04/2021	07/04/2021	07/04/2021	07/04/2021	
Analyte	Unit	Reporting Limit	21-16875-1	21-16875-2	21-16875-3	21-16875-4	21-16875-5
Extractant Used			Reagent Water				
Initial pH	pН	1	5.7	5.7	5.7	5.7	5.7
Final pH	pН	1	7.4	7.8	6.8	6.0	7.5

SPLP Extraction

	Client	HA5 3.0	
	Da	te Sampled	07/04/2021
Analyte	Unit	Reporting Limit	21-16875-6
Extractant Used			Reagent Water
Initial pH	pН	1	5.7
Final pH	pН	1	3.4

Method Summary

SPLP Elements

SPLP extraction of soils followed by acid digestion and analysis of SPLP extracts by ICP-MS (In house procedure based on US EPA method 200.8).

SPLP Extraction

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SPLP was performed according to US EPA method 1312.

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Emily Hanna, B.Sc. Matthew Counsell, B.Sc. Trace Elements Team Leader Inorganics Team Leader



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

T 0508 HILL LAB (44 555 22) Т

- +64 7 858 2000
- E mail@hill-labs.co.nz

W www.hill-laboratories.com

Page 1 of 4

Certificate of Analysis

Client:	EHS Support New Zealand Limited	Lab No:	2579454	SPv3
Contact:	Andrew Rumsby	Date Received:	09-Apr-2021	
	C/- EHS Support New Zealand Limited	Date Reported:	03-May-2021	(Amended)
	PO Box 15887	Quote No:	92248	
	New Lynn	Order No:		
	Auckland 0604	Client Reference:		
		Submitted By:	Andrew Rumsby	

Sample Type: Soil

campie rype. con						
	Sample Name:	BH301 - 1.0m 06-Apr-2021 10:00 am	BH301 - 1.5m 06-Apr-2021 10:00 am	BH301 - 3.0m 06-Apr-2021 10:00 am	BH301 - 6.0m 06-Apr-2021 10:00 am	BH301 - 8.7m 06-Apr-2021 10:00 am
	Lab Number:	2579454.1	2579454.2	2579454.3	2579454.4	2579454.5
Individual Tests					1	
SPLP Sample Weight	g	50	50	50	50	50
SPLP Extractant Type*		De-ionised Water,	De-ionised Water,	De-ionised Water,	De-ionised Water,	De-ionised Water,
		pH 5.8 +/- 0.4	pH 5.8 +/- 0.4	pH 5.8 +/- 0.4	pH 5.8 +/- 0.4	pH 5.8 +/- 0.4
SPLP Final pH	pH Units	9.0	9.3	8.1	8.9	9.6
Total Recoverable Aluminium	mg/kg dry wt	4,700	5,000	5,500	4,600	4,100
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	26	22	22
Total Recoverable Cobalt	mg/kg dry wt	3.1	5.7	6.7	5.5	8.3
Total Recoverable Thallium	mg/kg dry wt	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Heavy Metals, Screen Level						
Total Recoverable Arsenic	mg/kg dry wt	< 2	2	< 2	< 2	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	5	6	7	5	5
Total Recoverable Copper	mg/kg dry wt	20	21	20	17	22
Total Recoverable Lead	mg/kg dry wt	19.1	16.1	17.2	15.0	15.8
Total Recoverable Nickel	mg/kg dry wt	3	8	6	7	7
Total Recoverable Zinc	ma/ka drv wt	66	59	55	54	84
					0 1	
	Sample Name:	BH301 - 10.0m 06-Apr-2021 10:00 am	BH302 - 1.0m 06-Apr-2021 10:00 am	BH302 - 1.8m 06-Apr-2021 10:00 am	BH302 - 3.0m 06-Apr-2021 10:00 am	BH302 - 6.0m 06-Apr-2021 10:00 am
	Sample Name:	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10
Individual Tests	Sample Name: Lab Number:	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10
Individual Tests SPLP Sample Weight	Sample Name: Lab Number:	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50
Individual Tests SPLP Sample Weight SPLP Extractant Type*	Sample Name: Lab Number:	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water,	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water,	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water,	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water,	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water,
Individual Tests SPLP Sample Weight SPLP Extractant Type*	Sample Name: Lab Number:	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH	Sample Name: Lab Number: g pH Units	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium	Sample Name: Lab Number: g pH Units mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level Total Recoverable Arsenic	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 4	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2 3	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 4	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2 6	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12.2 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level Total Recoverable Arsenic Total Recoverable Cadmium	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 4 4 < 0.10	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2 3 < 0.10	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 4 4 < 0.10	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2 6 6 < 0.10	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level Total Recoverable Arsenic Total Recoverable Cadmium Total Recoverable Chromium	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 4 < 0.10 5	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 20 19.3 < 0.2 3 < 0.10 5	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 4 < 0.10 6	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 111.0 0.2 6 6 < 0.10 5	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level Total Recoverable Arsenic Total Recoverable Cadmium Total Recoverable Chromium Total Recoverable Copper	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 4 < 0.10 5 34	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2 3 < 0.2 3 < 0.10 5 19	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 4 < 0.10 6 23	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2 6 6 < 0.10 5 20	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12 < 0.2 12 < 0.10 6 20
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Cobalt Total Recoverable Chromium Total Recoverable Cadmium Total Recoverable Copper Total Recoverable Copper Total Recoverable Lead	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 4 < 0.10 5 34 20	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 0.2 3 < 0.2 3 < 0.10 5 19 22	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 4 < 0.10 6 23 17.7	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2 6 6 < 0.10 5 20 17.3	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2
Individual Tests SPLP Sample Weight SPLP Extractant Type* SPLP Final pH Total Recoverable Aluminium Total Recoverable Boron Total Recoverable Boron Total Recoverable Cobalt Total Recoverable Thallium Heavy Metals, Screen Level Total Recoverable Arsenic Total Recoverable Cadmium Total Recoverable Copper Total Recoverable Copper Total Recoverable Lead Total Recoverable Lead	Sample Name: Lab Number: g pH Units mg/kg dry wt mg/kg dry wt	BH301 - 10.0m 06-Apr-2021 10:00 am 2579454.6 50 De-ionised Water, pH 5.8 +/- 0.4 9.1 6,700 < 20 2.1 0.2 2.1 0.2 4 < 0.10 5 34 20 3	BH302 - 1.0m 06-Apr-2021 10:00 am 2579454.7 50 De-ionised Water, pH 5.8 +/- 0.4 9.2 4,300 < 20 19.3 < 20 19.3 < 0.2 3 < 0.2 3 < 0.10 5 19 22 15	BH302 - 1.8m 06-Apr-2021 10:00 am 2579454.8 50 De-ionised Water, pH 5.8 +/- 0.4 9.3 4,900 < 20 9.1 < 0.2 9.1 < 0.2 4 < 0.10 6 23 17.7 9	BH302 - 3.0m 06-Apr-2021 10:00 am 2579454.9 50 De-ionised Water, pH 5.8 +/- 0.4 7.4 11,000 < 20 11.0 0.2 6 6 < 0.10 5 20 17.3 7	BH302 - 6.0m 06-Apr-2021 10:00 am 2579454.10 50 De-ionised Water, pH 5.8 +/- 0.4 8.7 6,300 < 20 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2 12.2 < 0.2



CCREDITED

TESTING LABORATO

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:	BH302 - 7.6m	BH302 - 10.0m			
	-	06-Apr-2021	06-Apr-2021			
	Lab Number	10:00 am	10:00 am			
Individual Tests	Lad Number:	2379434.11	2379434.12			
SPLP Sample Weight	0	50	50	_	-	_
SPLP Extractant Type*	9	De-ionised Water	De-ionised Water	_	_	_
		pH 5.8 +/- 0.4	pH 5.8 +/- 0.4			
SPLP Final pH	pH Units	8.7	9.1	-	-	-
Total Recoverable Aluminium	n mg/kg dry wt	5,300	9,700	-	-	-
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	-	-	-
Total Recoverable Cobalt	mg/kg dry wt	1.0	9.6	-	-	-
Total Recoverable Thallium	mg/kg dry wt	< 0.2	< 0.2	-	-	-
Heavy Metals, Screen Level		1				
Total Recoverable Arsenic	mg/kg dry wt	7	13	-	-	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	< 0.10	-	-	-
Total Recoverable Chromium	mg/kg dry wt	5	9	-	-	-
Total Recoverable Copper	mg/kg dry wt	23	19	-	-	-
I otal Recoverable Lead	mg/kg dry wt	11.7	23	-	-	-
I otal Recoverable Nickel	mg/kg dry wt	<2	9	-	-	-
I UTAI RECOVERADIE ZINC	mg/kg dry wt	15	55	-	-	-
Sample Type: Aqueous	S					
	Sample Name:	BH301 - 1.0m	BH301 - 1.5m	BH301 - 3.0m	BH301 - 6.0m	BH301 - 8.7m
	Lab Numboru	[SPLP Extract]	[SPLP Extract]	[SPLP Extract]	[SPLP Extract]	[SPLP Extract]
Individual Tests	Lap Number.	2070404.10	2010-04.14	2010-04.10	2070404.10	2070404.17
Total Aluminium	a/m ³	1 98	47	1 25	21	2.8
Total Boron	g/m	0.25	1.51	0.29	0.32	1.30
Total Cobalt	g/m ³	< 0.0042	< 0.0042	< 0.0042	< 0.0042	< 0.0042
Total Thallium	g, g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
Heavy metals, totals, screen	As,Cd,Cr,Cu,Ni,Pb,	Zn				
Total Arsenic	a/m ³	< 0.021	< 0.021	< 0.021	< 0.021	< 0.021
Total Cadmium	g/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
Total Chromium	g/m ³	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011
Total Copper	g/m ³	< 0.011	0.014	< 0.011	< 0.011	< 0.011
Total Lead	g/m ³	0.0088	0.0178	0.0049	0.0076	0.0096
Total Nickel	g/m³	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011
Total Zinc	g/m³	0.044	0.029	< 0.021	< 0.021	0.027
	Sample Name:	BH301 - 10.0m [SPLP Extract]	BH302 - 1.0m [SPLP Extract]	BH302 - 1.8m [SPLP Extract]	BH302 - 3.0m [SPLP Extract]	BH302 - 6.0m [SPLP Extract]
In all datural Tooto	Lab Number:	2579454.18	2579454.19	2579454.20	2579454.21	2579454.22
	-1- 0	4.0	A E	2.0	0.63	2.0
	g/m ³	4.ð	4.5	3.ð	0.03	3.0
Total Cobalt	g/m ³		0.20	0.29	< 0.11	0.17
Total Thallium	g/m ³	< 0.0042	< 0.0042	< 0.0042	< 0.0139	< 0.0042
Heavy metals totals screen	As Cd Cr Cu Ni Ph	7n	< 0.0011	< 0.0011	< 0.0011	< 0.0011
Total Arcenic	a/m ³	~ 0.021	~ 0.021	< 0.021	~ 0.021	~ 0.021
Total Cadmium	g/m ³			< 0.021	< 0.021	< 0.021
Total Chromium	g/11° a/m ³	< 0.0011	< 0.0011	< 0.0011	< 0.0011	< 0.0011
Total Copper	g/11 ⁻	0.027	< 0.011	< 0.011	< 0.011	< 0.011
Total Lead	g/m ³	0.0098	0.0080	0.0043	< 0.0021	< 0.0021
Total Nickel	a/m ³	< 0.011	< 0.011	< 0.011	< 0.011	< 0.011
Total Zinc	g/m ³	0.061	0.022	< 0.021	< 0.021	< 0.021
	Comple Name	BH302 7 6m	BH302 10.0m			
	Sample Name:	SPLP Extract	SPLP Extract			
	Lab Number:	2579454.23	2579454.24			

Sample Type: Aqueous						
Sample Nam	ne:	BH302 - 7.6m [SPLP Extract]	BH302 - 10.0m [SPLP Extract]			
Lab Numb	er:	2579454.23	2579454.24			
Individual Tests						
Total Aluminium g	/m³	3.9	3.2	-	-	-
Total Boron g	/m³	< 0.11	0.13	-	-	-
Total Cobalt g	/m³	< 0.0042	< 0.0042	-	-	-
Total Thallium g	/m³	< 0.0011	< 0.0011	-	-	-
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni	,Pb,Zr	n				
Total Arsenic g	/m³	< 0.021	< 0.021	-	-	-
Total Cadmium g	/m³	< 0.0011	< 0.0011	-	-	-
Total Chromium g	/m³	< 0.011	< 0.011	-	-	-
Total Copper g	/m³	< 0.011	< 0.011	-	-	-
Total Lead g	/m³	0.0048	0.0039	-	-	-
Total Nickel g	/m³	< 0.011	< 0.011	-	-	-
Total Zinc g	/m³	< 0.021	< 0.021	-	-	-

Analyst's Comments

Amended Report: This certificate of analysis replaces report '2579454-SPv2' issued on 27-Apr-2021 at 2:49 pm. Reason for amendment: Additional testing added.

Summary of Methods

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

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Individual Tests			
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-12
Total Recoverable Aluminium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	10 mg/kg dry wt	1-12
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	1-12
Total Recoverable Cobalt	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	1-12
Total Recoverable Thallium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.2 mg/kg dry wt	1-12
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	1-12
SPLP Profile*	Extraction at 30 +/- 2 rpm for 18 +/- 2 hours, (Ratio 1g sample : 20g extraction fluid). US EPA 1312.	-	1-12
SPLP Profile			
SPLP Sample Weight	Gravimetric. US EPA 1312.	0.1 g	1-12
SPLP Extractant Type*	US EPA 1312 (Modified for New Zealand conditions to use De- ionised Water unless otherwise specified).	-	1-12
SPLP Final pH	pH meter. US EPA 1312.	0.1 pH Units	1-12
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) 23 rd ed. 2017.	-	13-24
Total Aluminium	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 23 rd ed. 2017.	0.063 g/m ³	13-24
Total Boron	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 23 rd ed. 2017.	0.11 g/m ³	13-24
Total Cobalt	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 23rd	0.0042 g/m ³	13-24

ed. 2017.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Thallium	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 23 rd ed. 2017.	0.0011 g/m ³	13-24
Heavy metals, totals, screen As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, screen level. APHA 3125 B 23 rd ed. 2017.	0.0011 - 0.021 g/m ³	13-24

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

Testing was completed between 13-Apr-2021 and 03-May-2021. For completion dates of individual analyses please contact the laboratory.

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

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

Ara Heron BSc (Tech) Client Services Manager - Environmental