

1 November 2022

Hometown Australia Holdings  
C/- ADW Johnson Pty Ltd  
5 Pioneer Avenue  
Tuggerah NSW 2259

**Attention: Ms Stephanie van Dissel**

Dear Stephanie

**RE: PROPOSED REZONE AND EXTENSION OF SUNRISE LIFESTYLE VILLAGE,  
4029-4045 NELSON BAY ROAD, BOBS FARM, NSW,  
PRELIMINARY ACID SULFATE SOIL ASSESSMENT.**

## **1 INTRODUCTION**

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present the findings of a Preliminary Acid Sulfate Soil (ASS) Assessment for material that may be excavated at 4029-4045 Nelson Bay Road, Bobs Farm, NSW (the site). The site is proposed for extension of the existing Sunrise Lifestyle Village, following rezoning. The site location is shown on Figure 1, attached.

The Port Stephens Local Environmental Plan (LEP) 2013 maps the site as Class 4 ASS which requires development consent and an ASS Management Plan (ASSMP) for *“Works more than 2 metres below the natural ground surface. Works by which the watertable is likely to be lowered more than 2 metres below the natural ground surface.”*

For the purpose of the rezoning and as the proposed depth of excavations is not currently known, a preliminary assessment to 2.0m below ground surface was carried out on the site. Once the proposed depth of excavation is known, if it is greater than 2m further assessment would be required.

The ASS assessment has been completed in accordance with the ASSMAC (1998) Acid Sulfate Soil Manual and the relevant National ASS Guidance (Sullivan et al 2018). Reference is also made to Dear et al (2014) Queensland Acid Sulfate Soil Technical Manual - Soil Management Guidelines Version 4.1.

## **2 OBJECTIVES**

The objectives of the works were to identify if ASS was present, to a depth of approximately 2m below ground surface, on the site.

## **3 SCOPE OF WORKS**

In order to meet the above objectives, the following works were carried out:

- Drilling of two boreholes;
- Collection of soil samples from the boreholes;
- Field screening of ASS samples, and laboratory analysis of selected samples; and

- Data assessment and preparation of this letter report.

#### **4 SITE DESCRIPTION**

The site is approximately 4.15ha and sits between Nelson Bay Road (to the south) and Trotter Road (to the north) with the Sunrise Lifestyle Village located on the western boundary. The eastern portion of the site is bounded by the intersection of Nelson Bay Road and Trotter Road. The site currently has two residential dwellings, multiple sheds, storage containers, pool and dense vegetation that surrounds the perimeter of the site.

#### **5 TOPOGRAPHY AND DRAINAGE**

Reference to the NSW Land and Property Information Spatial Information Exchange website (<https://six.nsw.gov.au/wps/portal/>) indicated the elevation of the site was below 10m AHD.

The site surface was generally flat. Rain falling on the site would be expected to infiltrate into the sandy site soils. Excess surface water may flow offsite to the north into an unnamed swamp, located approximately 200m north of the site. The swamp forms part of Bobs Farm Creek, located approximately 800m north of the site. Bobs Farm Creek flows into Tiligerry Creek, located approximately 2.2km north of the site.

#### **6 REGIONAL GEOLOGY**

The 1:100,000 Nelson Bay Coastal Quaternary Geological Maps indicates that the site is underlain Holocene back barrier flat: marine sand, silt, clay, gravel, shell. Some parts of the site maybe overlain with aeolian (wind derived) sand dunes.

#### **7 HYDROGEOLOGY**

Groundwater beneath the site is anticipated to be present in an unconfined aquifer within sands at depths greater than 2m below ground surface (bgs).

Groundwater flow direction is anticipated to flow to the north-north-east discharging to either Bobs Farm Creek, located approximately 800m north of the site or Tiligerry Creek, located approximately 2.2km north of the site. Tiligerry Creek flows into Port Stephens about 4.5km to the north east.

It should be noted that groundwater conditions can vary due to rainfall and other influences including regional groundwater flow, temperature, permeability, recharge areas, surface condition, and subsoil drainage.

#### **8 FIELD WORK**

Field work was carried out by an Environmental Scientist from Qualtest on 18 October 2022. Two boreholes (BH01, BH02) were drilled on the site. The borehole locations are shown in Figure 1, attached.

The boreholes were drilled using a hand auger, to depths of about 2m below ground surface (bgs). Soil samples were collected at intervals of approximately 0.5m. The samples were placed into zip-lock bags and stored in an ice filled esky during fieldwork and transport to the laboratory. Disposable nitrile gloves were used during collection of samples.

Photographs taken during fieldworks are provided below.



Photo 1 – Showing Aeolian Sand in hand auger (BH01)



Photo 2 – Showing material from hand auger (BH02)

## 9 SUBSURFACE CONDITIONS

Table 9.1 presents a summary of the typical soil profiles observed at the borehole locations during the field investigations, divided into representative geotechnical units. The borehole logs are also attached.

**Table 9.1 – Summary of Soil Profile**

Unit	Soil Description	Depth Range (m)
Topsoil	TOPSOIL: SAND – fine to coarse grained, grey.	0.0-0.15
Aeolian	SAND – fine to coarse grained, brown, pale brown, white.	0.15-2.0

Note: \* End of Hole, due to collapse.

No odours and/or anthropogenic materials were observed during hand auguring.

## 10 ACID SULFATE SOILS

### 10.1 Risk Map

Reference to the Acid Sulfate Soil online database from State of NSW and Department of Planning, Industry and Environment, 2021 ([espad.environment.nsw.gov.au](https://espad.environment.nsw.gov.au)) indicates that the site is located in an area of low probability of ASS >3m below ground surface (bgs). It is noted that an area located approximately 80m to the north of the site is located within an area of high probability of ASS <1m bgs.

The Port Stephens Local Environmental Plan (LEP) 2013 maps the site as Class 4 ASS which requires development consent and an ASS Management Plan (ASSMP) for “Works more than 2 metres below the natural ground surface. Works by which the water table is likely to be lowered more than 2 metres below the natural ground surface.”

The site overlain on the risk map and the Port Stephens Council LEP map are presented as Figures 2 and 3, attached.

### 10.2 Occurrence

Acid sulfate soils can form in a number of geologic and geomorphic landscapes provided there is a source of iron, sulfate and soil bacteria. Coastal Acid Sulfate Soils (CASS) have formed along the east coast of Australia, since the last glacial period (19,000 to 18,000 years ago), when sea levels were around 120m to 130m below today's levels.

Sea levels rose rapidly to about 7,000 years ago, reaching a height about 1.0m above the present day mean sea level (0.0m AHD), at which time they stabilised. Since that time there has been a slow accumulation of coastal sediments within the intertidal zone, including saline wetlands, salt marshes and as bottom sediments in embayments, coastal rivers, estuaries and coastal lakes. This accumulation is still occurring today.

CASS are found along most of the coast of mainland Australia, generally found below about 5m AHD where tidal ranges are large, such as northern Queensland. Along coastal areas with

smaller tidal ranges, it is rare to find significant accumulations of CASS above about 2m AHD (Simpson et al 2018).

The formation of sulfidic sediments is a natural part of the sulfur cycle where sulfates from sea water, in combination with iron and sulfate reducing bacteria (SRB), combine to produce reduced inorganic sulphides (RIS). RIS can include iron disulfides (FeS<sub>2</sub>), pyrite and marcasite, monosulfides (FeS) and elemental sulfur (S<sub>8</sub>) (Sullivan et al 2018). Provided these sediments remain in an anoxic state (saturated) they are benign (Dear et al 2014, Sullivan et al 2018).

### 10.3 Action Criteria

In order to assess the presence of ASS, the laboratory results were compared to Action Criteria from ASSMAC (1998) Acid Sulfate Soil Manual.

The ASSMAC (1998) action levels are based on oxidisable sulfur concentrations for three differing soil textures. There are separate action levels depending on the amount of soil disturbed as a result of the proposed works. For this project it has been assumed that less than 1000 tonnes of ASS would be disturbed. The applicable action levels are indicated below in Table 10.1.

**Table 10.1 – ASSMAC (1998) Action Criteria**

Texture Category	Approx. Clay Content (%)	Action Criteria	
		Net Acidity (S <sub>CR</sub> /S <sub>POS</sub> ) (%)	Net Acidity (mol H <sup>+</sup> /tonne)
Coarse	<5%	0.03	18
Medium	5 to 40%	0.06	36
Fine	>40%	0.1	62

### 10.4 Field Screening

Field screening of the ten samples collected was carried out by an experienced Qualtest Environmental Scientist, at our Mayfield West laboratory. The field screening sheets are attached, and a summary of the results provided in Table 10.2 below.

**Table 10.2 – Results of Field Screening Tests**

Sample ID	pH <sub>F</sub>	pH <sub>FOX</sub>	Reaction
BH01 0.1-0.2	6.32	4.65	None Observed
BH01 0.4-0.5	6.52	4.72	None Observed
BH01 0.9-1.0	7.00	4.75	None Observed
BH01 1.4-1.5	6.95	4.79	None Observed
BH01 1.9-2.0	6.92	4.67	None Observed
BH02 0.1-0.2	6.40	3.96	None Observed
BH02 0.4-0.5	6.77	3.80	None Observed
BH02 0.9-1.0	7.22	3.75	None Observed
BH02 1.4-1.5	6.90	4.12	None Observed
BH02 1.9-2.0	6.93	3.88	None Observed

A pH<sub>FOX</sub> around 3.5 or lower, can sometimes indicate a potential for reduced inorganic sulphides (RIS) to be present within the soils. None of the screened samples recorded a pH<sub>FOX</sub> below 3.5.

### 10.5 Laboratory Results

Based on the results of the field screening, as a conservative measure, two samples were selected for laboratory analysis. The sample was dispatched to NATA accredited laboratory Eurofins MGT for Chromium Reducible Sulfur (CRS) testing. The laboratory reports are attached.

**Table 10.3: Laboratory Results**

Sample ID	Description	pH <sub>KCL</sub>	TAA (mol H <sup>+</sup> /t)	Scr (%S)	Net Acidity (%S)
BH02 0.4-0.5	SAND: fine to coarse grained, brown.	5.1	4.8	<0.005	0.013
BH02 0.9-1.0	SAND: fine to coarse grained, pale brown.	5.0	5.9	<0.005	0.014
<b>Action Criteria*</b>		-	<b>18</b>	<b>0.03</b>	<b>0.03</b>

\*ASSMAC (1998), Acid Sulfate Soil Manual, Table 4.4 – Action Criteria for coarse textured soil, <1000 tonnes

The laboratory results showed Titratable Actual Acidity (TAA) below the adopted criteria of 18mol H<sup>+</sup>/tonne in each sample tested, and Chromium Reducible Sulfur (Scr) and Net Acidity below the adopted criteria of 0.03%S in each sample tested.



## 11 CONCLUSION AND RECOMMENDATIONS

ASS were not considered to be present in the soils to the depth investigated (2.0m) based on field observations and results of the laboratory analysis.

The field screening indicated that ASS were unlikely to be present. This was confirmed by the results of the laboratory testing which showed concentrations of net acidity, and Chromium Reducible Sulfur below the action criteria in each sample tested.

Based on the results of the assessment, an ASS Management Plan is not required for excavation to 2.0m bgs. It is noted that ASS may be present in soils deeper than 2.0m. If deeper excavations are proposed, further assessment at depth would be required.

## 12 LIMITATIONS

The findings presented in the report and used as the basis for recommendations presented herein were obtained using industry accepted practices and standards. To our knowledge, they represent a reasonable interpretation of the general conditions of the site. However, it is noted that under no circumstances, can it be considered that these findings represent the actual state of the site at all points. A suitable qualified geotechnical engineer/environmental scientist should be contacted if the subsurface conditions encountered during earthworks differ from those described.

Data and opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement by Qualtest. If this report is reproduced, it must be in full.

If you have any further questions regarding this report, please do not hesitate to contact the undersigned.

For and on behalf of Qualtest Laboratory (NSW) Pty Ltd.



Libby Betz  
Senior Environmental Scientist

### Attachments:

Figure 1 – Site and Sampling Locations  
Figure 2 – ASS Risk Map  
Figure 3 – ASS Class Map – Lake Macquarie LEP  
Borehole Logs  
Field Screening Results  
Laboratory Reports





Image obtained from Google Earth 27 October 2022

Client:	HOMETOWN AUSTRALIA HOLDINGS	Drawing No:	FIGURE 1
Project:	ACID SULFATE SOIL ASSESSMENT	Project No:	NEW22P-0199-AB
Location:	4029-4045 NELSON BAY ROAD, BOBS FARM, NSW	Scale:	N.T.S.
Title:	SITE LOCATION	Date:	27/10/2022



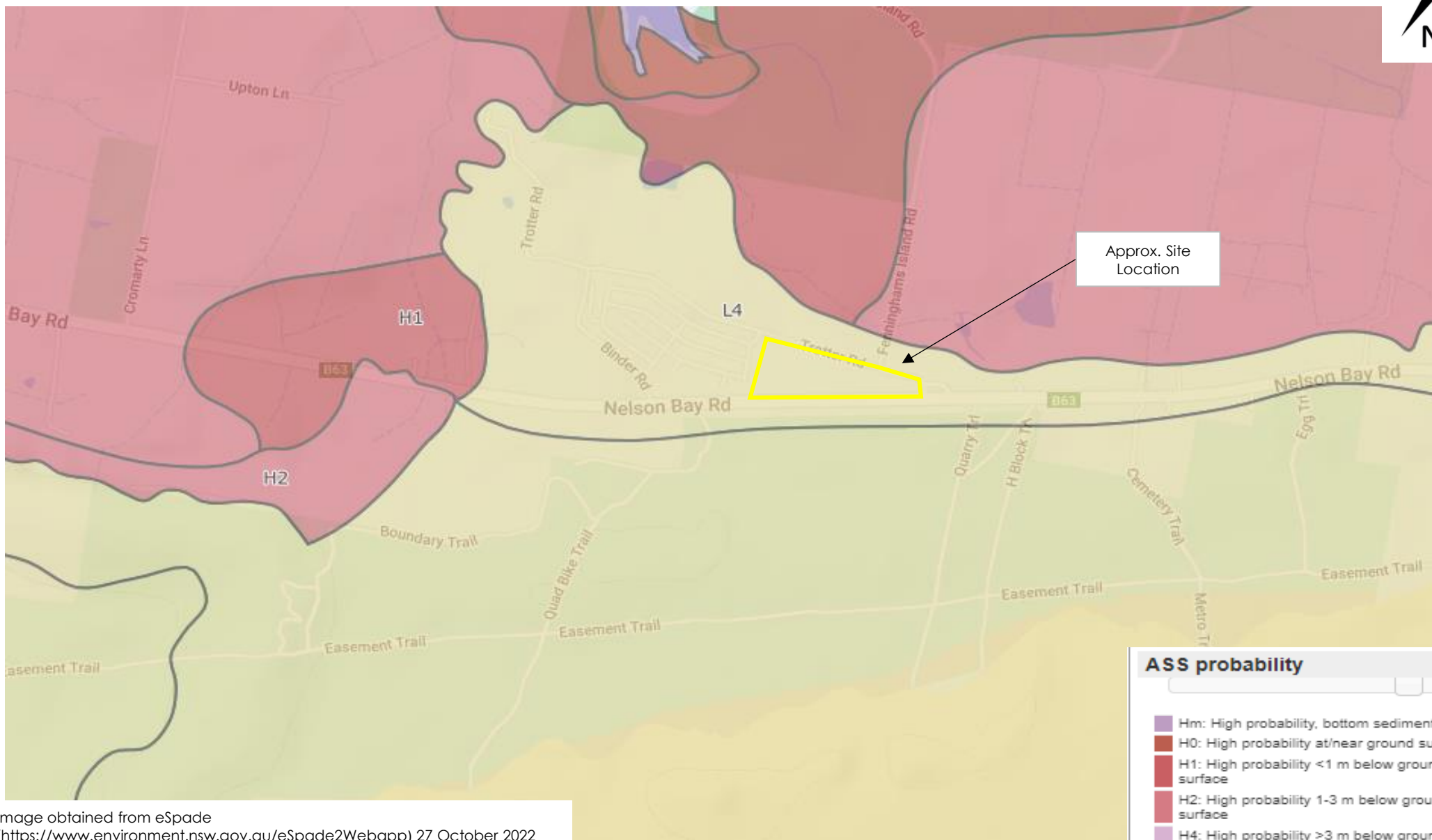
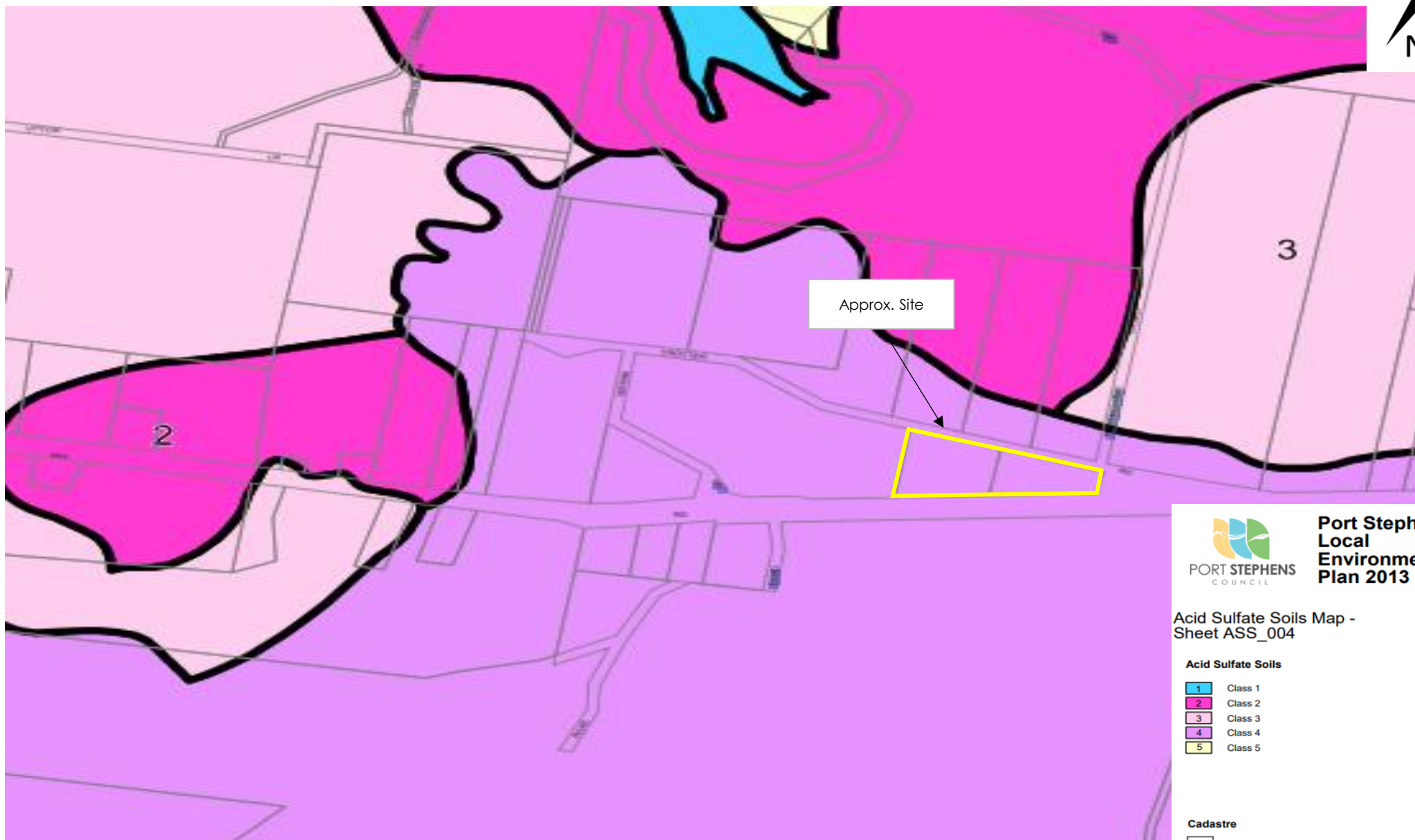


Image obtained from eSpade  
(<https://www.environment.nsw.gov.au/eSpade2Webapp>) 27 October 2022

Client:	HOMETOWN AUSTRALIA HOLDINGS	Drawing No:	FIGURE 2
Project:	ACID SULFATE SOIL ASSESSMENT	Project No:	NEW22P-0199-AB
Location:	4029-4045 NELSON BAY ROAD, BOBS FARM, NSW	Scale:	N.T.S.
Title:	ASS PROBABILITY	Date:	27/10/2022



Client:	HOMETOWN AUSTRALIA HOLDINGS	Drawing No:	FIGURE 3
Project:	ACID SULFATE SOIL ASSESSMENT	Project No:	NEW22P-0199-AB
Location:	4029-4045 NELSON BAY ROAD, BOBS FARM, NSW	Scale:	N.T.S.
Title:	ASS LEP CLASSIFICATION	Date:	27/10/2022

# ENGINEERING LOG - BOREHOLE

**CLIENT:** Hometown Australia Holdings  
**PROJECT:** ASS Assessment  
**LOCATION:** 4029 Nelson Bay Road, Bobs Farm

**BOREHOLE NO:** BH01  
**PAGE:** 1 OF 1  
**JOB NO:** NEW22P-0199  
**LOGGED BY:** TH  
**DATE:** 18/10/22

**DRILL TYPE:** HAND AUGER  
**BOREHOLE DIAMETER:** 50 mm

**SURFACE RL:**  
**DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered	0.10m		<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div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LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)		Moisture Condition	
<b>Water</b>		U <sub>50</sub> 50mm Diameter tube sample		VS	Very Soft	<25		D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50		M	Moist
Water Inflow		E Environmental sample (Glass jar, sealed and chilled on site)		F	Firm	50 - 100		W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)		St	Stiff	100 - 200		W <sub>p</sub>	Plastic Limit
<b>Strata Changes</b>		B Bulk Sample		VSt	Very Stiff	200 - 400		W <sub>L</sub>	Liquid Limit
Gradational or transitional strata		<b>Field Tests</b>		H	Hard	>400			
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable				
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		<b>Density</b>		V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)		L		L	Loose	Density Index 15 - 35%	
				MD		MD	Medium Dense	Density Index 35 - 65%	
				D		D	Dense	Density Index 65 - 85%	
				VD		VD	Very Dense	Density Index 85 - 100%	




# ENGINEERING LOG - BOREHOLE

**CLIENT:** Hometown Australia Holdings  
**PROJECT:** ASS Assessment  
**LOCATION:** 4029 Nelson Bay Road, Bobs Farm

**BOREHOLE NO:** BH02  
**PAGE:** 1 OF 1  
**JOB NO:** NEW22P-0199  
**LOGGED BY:** TH  
**DATE:** 18/10/22

**DRILL TYPE:** HAND AUGER  
**BOREHOLE DIAMETER:** 50 mm

**SURFACE RL:**  
**DATUM:**

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
HA	Not Encountered	0.10m		0.5		SP	TOPSOIL: SAND - fine to coarse grained, grey.	M				TOPSOIL
		ASS 0.20m				0.15m	SAND - fine to coarse grained, brown.					AEOLIAN DEPOSITS
		0.40m				Becoming pale brown.						
		ASS 0.50m										
		0.90m										
		ASS 1.00m					SP					
		1.40m										
		ASS 1.50m										Becoming white and brown.
		1.90m										
		ASS 2.00m					2.00m					
	Hole Terminated at 2.00 m											

<b>LEGEND:</b>		<b>Notes, Samples and Tests</b>		<b>Consistency</b>		<b>UCS (kPa)</b>	<b>Moisture Condition</b>
<b>Water</b>		U <sub>50</sub>	50mm Diameter tube sample	VS	Very Soft	<25	D Dry
Water Level (Date and time shown)		CBR	Bulk sample for CBR testing	S	Soft	25 - 50	M Moist
Water Inflow		E	Environmental sample (Glass jar, sealed and chilled on site)	F	Firm	50 - 100	W Wet
Water Outflow		ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)	St	Stiff	100 - 200	W <sub>p</sub> Plastic Limit
<b>Strata Changes</b>		B	Bulk Sample	VSt	Very Stiff	200 - 400	W <sub>L</sub> Liquid Limit
Gradational or transitional strata				H	Hard	>400	
Definitive or distinct strata change				Fb	Friable		
		<b>Field Tests</b>		<b>Density</b>			
		PID	Photoionisation detector reading (ppm)	V	Very Loose	Density Index <15%	
		DCP(x-y)	Dynamic penetrometer test (test depth interval shown)	L	Loose	Density Index 15 - 35%	
		HP	Hand Penetrometer test (UCS kPa)	MD	Medium Dense	Density Index 35 - 65%	
				D	Dense	Density Index 65 - 85%	
				VD	Very Dense	Density Index 85 - 100%	

## Acid Sulfate Soil Screening Test Report

Client:	Hometown Australia Holdings	Date Tested:	18.10.2022	Project No:	NEW22P-0199
Project:	ASS Assessment	Tested By:	TH	Sheet No:	1 of 1
Location:	4029 Nelson Bay Road, Bobs Farm	Date Sampled:	18.10.2022		

Hydrogen peroxide pH prior to use (4.5 to 5.5): 5.2

Hydrogen peroxide temperature prior to use: 20.2

Sample Location	Sample Depth	Soil Description	pH <sub>F</sub> (pH in 1:5 Soil: Deionised Water)	pH <sub>FOX</sub> (oxidation in 30% hydrogen peroxide)									pH change (pH <sub>F</sub> - pH <sub>FOX</sub> )	Additional Observations / Comments (e.g. presence of shells or organics)	
				Duration (minutes)	pH <sub>FOX</sub>	Temperature During Oxidation	Colour Before Oxidation	Colour After Oxidation	Effervescence						Sulfurous Odour
									None Observed	Slight	Moderate	Vigorous			
BH01	0.1-0.2	Sand	6.32	15	4.65	21	Dark brown	Dark brown	/				No	1.67	No odour, no organics
BH01	0.4-0.5	Sand	6.52	15	4.72	20	Brown	Brown	/				No	1.80	No odour, no organics
BH01	0.9-1.0	Sand	7.00	15	4.75	20	Brown	Brown	/				No	2.25	No odour, no organics
BH01	1.4-1.5	Sand	6.95	15	4.79	20	Brown	Brown	/				No	2.16	No odour, no organics
BH01	1.9-2.0	Sand	6.92	15	4.67	20	Brown	Brown	/				No	2.25	No odour, no organics
BH02	0.1-0.2	Sand	6.40	15	3.96	20	Dark brown	Dark brown	/				No	2.44	No odour, no organics
BH02	0.4-0.5	Sand	6.77	15	3.80	20	Brown	Brown	/				No	2.97	No odour, no organics
BH02	0.9-1.0	Sand	7.22	15	3.75	20	Brown	Brown	/				No	3.47	No odour, no organics
BH02	1.4-1.5	Sand	6.90	15	4.12	20	Pale brown	Pale brown	/				No	2.78	No odour, no organics
BH02	1.9-2.0	Sand	6.93	15	3.88	20	Pale brown	Pale brown	/				No	3.05	No odour, no organics

### Explanatory Notes:

Acid Sulfate Soil (ASS) screening provides an early indication of the likely presence of actual or potential ASS, and should be followed by analytical testing if screening results are of concern. As a guide:

- pH<sub>F</sub> ≤ 4 is indicative of actual ASS.
- pH<sub>F</sub> > 4 and < 5.5 are acid and may be the result of some previous or limited oxidation of sulfites, but is not confirmatory of actual ASS.
- Potential positive reactions include one or more of the following:
  - Change in colour of the soil from grey tones to brown tones
  - Effervescence
  - The release of sulfurous odours
  - A substantial depression in pH<sub>FOX</sub> below pH<sub>F</sub>
  - pH<sub>FOX</sub> < 3.5

## CHAIN OF CUSTODY RECORD



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☐ Melbourne Laboratory  
6 Monterey Road Dandenong South VIC 3175  
03 8564 5000 EnviroSampleVIC@eurofins.com

Company	Qualtest	Project No	NEW22P-HTAH/NEW22P-0199	Project Manager	Libby Betz	Sampler(s)	Libby Betz
Address	2 Murray Dwyer Circuit, Mayfield West NSW 2304	Project Name	Bobs Farm	EDD Format	Excel	Handed over by	
Contact Name	Libby Betz	Where metals are requested, please specify 'Total' or 'Filtered'. SUTTE code must be used to extract SUTTE pricing. Chromium Reducible Sulfide					
Phone No	432189418						
Special Directions	Samples have job number listed as NEW22P-HTAH, please report as NEW22P-0199.	Analyses					
Purchase Order		Change container type & size if necessary.					
Quote ID No	180622QUAN-3	Containers					
No	Client Sample ID	Sampled Date/Time dd/mm/yyyy hh:mm	Matrix Solid (S) Water (W)	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass
1	BH01_0.1-0.2	18/10/22	Soil	500mL PFAS Bottle	40mL VOA vial		
2	BH01-0.4-0.5	18/10/22	Soil				
3	BH01-0.9-1.0	18/10/22	Soil				
4	BH01_1.4-1.5	18/10/22	Soil				
5	BH01-1.9-2.0	18/10/22	Soil				
6	BH02_0.1-0.2	18/10/22	Soil				
7	BH02-0.4-0.5	18/10/22	Soil				
8	BH02-0.9-1.0	18/10/22	Soil				
9	BH02_1.4-1.5	18/10/22	Soil				
10	BH02-1.9-2.0	18/10/22	Soil				
Total Counts		2					
Method of Shipment	<input type="checkbox"/> Courier (#) <input type="checkbox"/> Hand Delivered			Signature	Libby Betz	Date	19/10/2022
Laboratory Use Only		Received By	Signature	Signature	Libby Betz	Date	19/10/22
		Received By	Signature	Signature		Date	
						Temperature	14.7
						Report No	933971

Eurofins Environmental Testing Australia Pty Ltd



## Eurofins Environment Testing Australia Pty Ltd

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NATA# 1261 Site# 20794

### Newcastle

4/52 Industrial Drive  
Mayfield East NSW 2304  
PO Box 60 Wickham 2293  
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NATA# 1261 Site# 25079

## Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

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Welshpool  
WA 6106  
Tel: +61 8 6253 4444  
NATA# 2377 Site# 2370

## Eurofins Environment Testing NZ Ltd

NZBN: 9429046024954

### Auckland

35 O'Rorke Road  
Penrose,  
Auckland 1061  
Tel: +64 9 526 45 51  
IANZ# 1327

### Christchurch

43 Detroit Drive  
Rolleston,  
Christchurch 7675  
Tel: 0800 856 450  
IANZ# 1290

## Sample Receipt Advice

**Company name:** Qualtest  
**Contact name:** Libby Betz  
**Project name:** BOBS FARM  
**Project ID:** NEW22P-HTAH/NEW22P-0199  
**Turnaround time:** 5 Day  
**Date/Time received:** Oct 19, 2022 2:10 PM  
**Eurofins reference:** 933971

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

**Andrew Black on phone : (+61) 2 9900 8490 or by email: [AndrewBlack@eurofins.com](mailto:AndrewBlack@eurofins.com)**

Results will be delivered electronically via email to Libby Betz - [libbybetz@qualtest.com.au](mailto:libbybetz@qualtest.com.au).

*Note: A copy of these results will also be delivered to the general Qualtest email address.*

**Qualtest**  
**2 Murray Dwyer Circuit**  
**Mayfield West**  
**NSW 2304**



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 20794**

Accredited for compliance with ISO/IEC 17025 – Testing  
 NATA is a signatory to the ILAC Mutual Recognition  
 Arrangement for the mutual recognition of the  
 equivalence of testing, medical testing, calibration,  
 inspection, proficiency testing scheme providers and  
 reference materials producers reports and certificates.

**Attention:** **Libby Betz**

**Report** **933971-S**  
 Project name **BOBS FARM**  
 Project ID **NEW22P-HTAH/NEW22P-0199**  
 Received Date **Oct 19, 2022**

<b>Client Sample ID</b>			<b>BH02_0.4-0.5</b>	<b>BH02_0.9-1.0</b>
<b>Sample Matrix</b>			<b>Soil</b>	<b>Soil</b>
<b>Eurofins Sample No.</b>			<b>B22- Oc0045298</b>	<b>B22- Oc0045299</b>
<b>Date Sampled</b>			<b>Oct 18, 2022</b>	<b>Oct 18, 2022</b>
<b>Test/Reference</b>	<b>LOR</b>	<b>Unit</b>		
<b>Actual Acidity (NLM-3.2)</b>				
pH-KCL (NLM-3.1)	0.1	pH Units	5.1	5.0
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.008	0.009
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	4.8	5.9
<b>Potential Acidity - Chromium Reducible Sulfur</b>				
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) <sup>S04</sup>	0.005	% S	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3
<b>Extractable Sulfur</b>				
Sulfur - KCl Extractable	0.005	% S	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A
<b>Retained Acidity (S-NAS)</b>				
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 <sup>S02</sup>	0.02	% S	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0
<b>Acid Neutralising Capacity (ANCbt)</b>				
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) <sup>S03</sup>	0.02	% S	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A
ANC Fineness Factor		factor	1.5	1.5
<b>Net Acidity (Including ANC)</b>				
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	< 0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	< 10	< 10
CRS Suite - Liming Rate - NASSG (Including ANC) <sup>S01</sup>	1	kg CaCO3/t	< 1	< 1
<b>Extraneous Material</b>				
<2mm Fraction	0.005	g	79	44
>2mm Fraction	0.005	g	< 0.005	< 0.005
Analysed Material	0.1	%	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1
% Moisture	1	%	4.8	3.7

**Sample History**

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

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

Description	Testing Site	Extracted	Holding Time
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Oct 26, 2022	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Oct 26, 2022	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Brisbane	Oct 21, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			



**Company Name:** Qualtest  
**Address:** 2 Murray Dwyer Circuit  
Mayfield West  
NSW 2304  
**Project Name:** BOBS FARM  
**Project ID:** NEW22P-HTAH/NEW22P-0199

**Order No.:** N/A  
**Report #:** 933971  
**Phone:** 02 4968 4468  
**Fax:** 02 4960 9775

**Received:** Oct 19, 2022 2:10 PM  
**Due:** Oct 26, 2022  
**Priority:** 5 Day  
**Contact Name:** Libby Betz

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Chromium Reducible Sulfur Suite	Moisture Set
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X	X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	BH02_0.4-0.5	Oct 18, 2022		Soil	B22-Oc0045298		X	X
2	BH02_0.9-1.0	Oct 18, 2022		Soil	B22-Oc0045299		X	X
3	BH01_0.1-0.2	Oct 18, 2022		Soil	B22-Oc0045300	X		
4	BH01_0.4-0.5	Oct 18, 2022		Soil	B22-Oc0045301	X		
5	BH01_0.9-1.0	Oct 18, 2022		Soil	B22-Oc0045302	X		
6	BH01_1.4-1.5	Oct 18, 2022		Soil	B22-Oc0045303	X		
7	BH01_1.9-2.0	Oct 18, 2022		Soil	B22-Oc0045304	X		
8	BH02_0.1-0.2	Oct 18, 2022		Soil	B22-Oc0045305	X		
9	BH02_1.4-1.5	Oct 18, 2022		Soil	B22-Oc0045306	X		
10	BH02_1.9-2.0	Oct 18, 2022		Soil	B22-Oc0045307	X		
Test Counts						8	2	2

## Internal Quality Control Review and Glossary

### General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

### Holding Times

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

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

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

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

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

### Units

<b>mg/kg:</b> milligrams per kilogram	<b>mg/L:</b> milligrams per litre	<b>µg/L:</b> micrograms per litre
<b>ppm:</b> parts per million	<b>ppb:</b> parts per billion	<b>%:</b> Percentage
<b>org/100 mL:</b> Organisms per 100 millilitres	<b>NTU:</b> Nephelometric Turbidity Units	<b>MPN/100 mL:</b> Most Probable Number of organisms per 100 millilitres

### Terms

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

### QC - Acceptance Criteria

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

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

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

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

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

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

## Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>LCS - % Recovery</b>										
<b>Actual Acidity (NLM-3.2)</b>										
pH-KCL (NLM-3.1)				%	98			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)				%	96			80-120	Pass	
<b>LCS - % Recovery</b>										
<b>Potential Acidity - Chromium Reducible Sulfur</b>										
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)				%	99			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>										
<b>Actual Acidity (NLM-3.2)</b>					Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	B22-Oc0043299	NCP	pH Units		4.9	5.0	1.2	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Oc0043299	NCP	% pyrite S		0.060	0.058	3.9	30%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Oc0043299	NCP	mol H+/t		38	36	3.9	20%	Pass	
<b>Duplicate</b>										
<b>Potential Acidity - Chromium Reducible Sulfur</b>					Result 1	Result 2	RPD			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	B22-Oc0043299	NCP	% S		< 0.005	< 0.005	<1	20%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	B22-Oc0043299	NCP	mol H+/t		< 3	< 3	<1	30%	Pass	
<b>Duplicate</b>										
<b>Extractable Sulfur</b>					Result 1	Result 2	RPD			
Sulfur - KCl Extractable	B22-Oc0043299	NCP	% S		< 0.005	< 0.005	<1	30%	Pass	
HCl Extractable Sulfur	B22-Oc0043299	NCP	% S		N/A	N/A	N/A	20%	Pass	
<b>Duplicate</b>										
<b>Retained Acidity (S-NAS)</b>					Result 1	Result 2	RPD			
Net Acid soluble sulfur (SNAS) NLM-4.1	B22-Oc0043299	NCP	% S		N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	B22-Oc0043299	NCP	% S		N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	B22-Oc0043299	NCP	mol H+/t		N/A	N/A	N/A	30%	Pass	
<b>Duplicate</b>										
<b>Acid Neutralising Capacity (ANCbt)</b>					Result 1	Result 2	RPD			
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	B22-Oc0043299	NCP	% CaCO3		N/A	N/A	N/A	20%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	B22-Oc0043299	NCP	% S		N/A	N/A	N/A	30%	Pass	
ANC Fineness Factor	B22-Oc0043299	NCP	factor		1.5	1.5	<1	30%	Pass	
<b>Duplicate</b>										
<b>Net Acidity (Including ANC)</b>					Result 1	Result 2	RPD			
CRS Suite - Net Acidity - NASSG (Including ANC)	B22-Oc0043299	NCP	% S		0.06	0.06	3.9	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	B22-Oc0043299	NCP	mol H+/t		38	36	3.9	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	B22-Oc0043299	NCP	kg CaCO3/t		2.8	2.7	3.9	30%	Pass	
<b>Duplicate</b>										
					Result 1	Result 2	RPD			
% Moisture	B22-Oc0045299	CP	%		3.7	3.6	1.7	30%	Pass	



## Comments

### Sample Integrity

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

### Qualifier Codes/Comments

Code	Description
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO <sub>3</sub> ) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m <sup>3</sup> in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m <sup>3</sup> '
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl is greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

### Authorised by:

Bonnie Pu	Analytical Services Manager
Jonathon Angell	Senior Analyst-Sample Properties
Jonathon Angell	Senior Analyst-SPOCAS



**Glenn Jackson**  
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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