

REF: 2500/LRF/chemtest/tg

Mr Donald Shore &
Phillip Property Holdings Ltd
By email
farm@strytisa.co.uk
Stephen.sorfleet@hibberts.com

Cc Clare.Simmons@Cullimoreddutton.co.uk

10th May 2021

Dear Donald & Stephen,

RE: LOWER RACKERY FARM, LLAY – CONTAMINATION ASSESSMENT

1.0 Introduction

As instructed, window sample boreholes with chemical testing were carried out at the Lower Rackery Farm site, Llay, on the 23rd March 2021.

We understand the investigation was required to confirm that previous filling on site had not resulted in possible land contamination. It is also understood that the fill placed on site was derived from a nearby development site.

This letter report presents the findings of the site investigation along with an assessment of the contamination status of the fill.

2.0 Site Location and Description

The site is located to the south of Dark Lane, Llay, at National Grid Reference SJ 326 574, see Figure 1.

The site is bounded by derelict farm buildings and concrete hardstanding to the northwest and dense, mixed hedging within livestock fencing to the west, east and south. Ponding water was observed within the south of the site, with the site gradually sloping to the north, see Figure 2.

The area of filling is visible mainly due to the lack of vegetation growth. From the site walkover it appears that the made ground is derived from glacial deposits, although several fragments of concrete and tarmac were observed at surface.

Photographs of the site are presented below;



Photograph 1. Looking south at derelict farm buildings.



Photograph 2. Ponding water in south of site.



Photograph 3. Looking north across the site.

3.0 Site Investigation

A site investigation was undertaken by GSL on the 23rd March 2021, and comprised thirteen window sample boreholes drilled to a maximum depth of 3.00m to confirm the thickness and composition of the made ground fill across the site. Samples were taken for chemical testing of the made ground to confirm if any ground contamination has occurred.

The boreholes were logged by a Geotechnical Engineer from GSL, in general accordance with BS 5930:2015. The borehole logs are presented in Appendix A, with their locations are shown on Figure 2.

Chemical Testing

Samples of the made ground were placed in the appropriate containers and a cool box, and taken immediately to the laboratories of DETS in County Durham for the following chemical testing:

Metals & Non-metals - Arsenic (As), Boron (B), Cadmium (Cd), Chromium (hexavalent), Chromium (Trivalent), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Phenol, Selenium (Se), and Zinc (Zn).
Petroleum Hydrocarbons - Benzene, Toluene, Ethylbenzene, o-xylene, m-xylene, p-xylene, Aliphatics >C5 – C44, Aromatics >EC5 – EC44.

Polyaromatic Hydrocarbons (PAH) – Acenaphthene, Acenaphthylene, Anthracene, Benz (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (g, h, i) perylene, Benzo (k) fluoranthene, Chrysene, Dibenzo (a, h) anthracene, Fluorene, Fluoranthene, Indeno (1,2,3-cd) pyrene, Naphthalene, Phenanthrene, Pyrene.

Other Contaminants – Sulphide (easily liberated), Water soluble Sulphate (2:1 extract), Cyanide, pH, Soil Organic Matter (SOM).

In addition, asbestos screening was carried out on the samples.

The results of the chemical testing are summarised in Section 5.0, and presented in full in Appendix B.

4.0 Ground Conditions

The boreholes revealed the following ground conditions:

BH Ref.	Topsoil (m)	Made Ground (m)	Glacial Deposits (m)	Glacial Till (m)
WS01	n/e	0.00 – 0.15	0.15 – 2.00	n/e
WS02	n/e	0.00 – 0.20	0.20 – 2.00	n/e
WS03	0.00 – 0.25	n/e	0.90 – 2.00	0.25 – 0.90
WS04	n/e	0.00 – 1.00	1.00 – 2.00	n/e
WS05	1.80 – 2.00	0.00 – 1.80	2.00 – 3.00	n/e
WS06	n/e	0.00 – 0.60	n/e	0.60 – 3.00
WS07	2.90 – 3.30	0.00 – 2.90	n/e	3.30 – 4.00
WS08	n/e	0.00 – 0.70	1.00 – 2.00	0.70 – 1.00
WS09	n/e	0.00 – 0.90	n/e	0.90 – 2.00
WS10	n/e	0.00 – 2.10	n/e	n/e
WS11	2.70 – 2.90	0.00 – 2.70	2.90 – 4.00	n/e
WS12	0.70 – 1.20	0.00 – 0.70	1.20 – 2.00	n/e
WS13	n/e	0.00 – 2.00	n/e	n/e

Topsoil

Topsoil was encountered in five of the thirteen boreholes, and was observed at surface in WS03, in the other boreholes it was observed as a relict topsoil, buried by the overlying made ground, which defines the historic ground level of the site. It was generally described as soft, dark brown, slightly sandy silt with rootlets.

Made Ground

Made ground was encountered in all locations except WS03, the majority of the made ground is associated with land reclamation by the landowner, where up to 2.90m of fill was observed in WS07 and WS11. The made ground was generally described as firm, dark brown, slightly sandy, gravelly clay, with gravel being angular to subangular fine to coarse of brick, wood, limestone and occasional plastic. It is considered to be derived from local excavations in glacial deposits.

Glacial Deposits

Glacial deposits were encountered in all but five boreholes and were generally described as loose, brown, fine to coarse sand.

Glacial Till

Glacial till was encountered within five of the boreholes and was generally described as firm, brown, gravelly, sandy clay. Gravel is subrounded fine to coarse of sandstone.

5.0 Chemical Testing Results

The results of the soil analyses are presented below, where they have been compared to suitable generic assessment criteria (GACs), in order to allow a generic quantitative risk assessment (GQRA) to be carried out for the site.

The Category 4 Screening Levels (C4SLs) published by DEFRA (2014) have been adopted in the first instance, which have been published for six substances to date. Where a C4SL is unavailable, the “Suitable 4 Use Levels” (S4ULs) published by LQM/CIEH (2015) have been adopted.

These criteria have been derived using the CLEA model for a range of standard end-use scenarios and a range of soil organic matter (SOM) contents. It should be noted that the C4SL values are derived on the basis of a “low level of toxicological concern”, while the S4UL values are based on a “tolerable” or “minimal” level of risk. As such, the S4ULs describe a lower level of risk than the C4SLs, and are equivalent to the former Soil Guideline Values (SGVs, published by the Environment Agency) and the previous editions of the LQM/CIEH GAC values.

A “residential with gardens” end-use has been adopted for this analysis, based on the most-conservative SOM content of 1%. This is the most stringent test.

Note: the S4UL values presented below are Copyright Land Quality Management Limited, reproduced with permission; Publication Number S4UL3668. All rights reserved.

Metals & Non-Metals	WS5	WS7	WS11	Count	Adopted Guideline (mg/kg)	Source	Exceedances
	0.50	0.50	0.50				
Arsenic	6.50	17.00	6.80	3	37	C4SL	0
Boron, Water Soluble	0.50	0.60	0.70	3	290	S4UL	0
Cadmium	0.50	2.30	0.40	3	22	C4SL	0
Chromium III	15.00	17.00	15.00	3	910	S4UL	0
Chromium, Hexavalent	< 1.0	< 1.0	< 1.0	3	21	C4SL	0
Copper	20.00	92.00	20.00	3	2400	S4UL	0
Lead	64.00	190.00	67.00	3	200	C4SL	0
Mercury	0.75	0.25	0.05	3	1.2	S4UL	0
Nickel	13.00	17.00	14.00	3	130	S4UL	0
Phenol - Monohydric	< 0.3	< 0.3	< 0.3	3	120	S4UL	0
Selenium	< 0.5	0.50	< 0.5	3	250	S4UL	0
Zinc	120.00	150.00	110.00	3	3700	S4UL	0

None of the above values exceeded SGV values for residential land use with gardens.

Petroleum Hydrocarbons	WS5	WS7	WS11	Count	Adopted Guideline (mg/kg)	Source	Exceedances
	0.50	0.50	0.50				
Aliphatic C5-C6	< 0.01	< 0.01	< 0.01	3	42	S4UL	0
Aliphatic C6-C8	< 0.01	< 0.01	< 0.01	3	100	S4UL	0
Aliphatic C8-C10	< 0.01	< 0.01	< 0.01	3	27	S4UL	0
Aliphatic C10-C12	< 1.5	< 1.5	3.00	3	130	S4UL	0
Aliphatic C12-C16	< 1.2	< 1.2	4.70	3	1100	S4UL	0
Aliphatic C16-C21	< 1.5	< 1.5	8.40	3	65000	S4UL	0
Aliphatic C21-C35	< 3.4	< 3.4	62.00	3	65000	S4UL	0
Aliphatic C35-C40	< 3.4	< 3.4	< 3.4	3	70	S4UL	0
Aromatic C5-C7	< 0.01	< 0.01	< 0.01	3	130	S4UL	0
Aromatic C7-C8	< 0.01	< 0.01	< 0.01	3	34	S4UL	0
Aromatic C8-C10	< 0.01	< 0.01	< 0.01	3	74	S4UL	0
Aromatic C10-C12	< 0.9	< 0.9	< 0.9	3	140	S4UL	0
Aromatic C12-C16	< 0.5	< 0.5	1.60	3	260	S4UL	0
Aromatic C16-C21	< 0.6	< 0.6	10.00	3	1100	S4UL	0
Aromatic C21-C35	< 1.4	< 1.4	120.00	3	1100	S4UL	0

None of the above values exceeded SGV values for residential land use with gardens.

Polyaromatic Hydrocarbons (PAH)	WS5	WS7	WS11				
	0.50	0.50	0.50	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Acenaphthene	0.06	0.04	< 0.03	3	210	S4UL	0
Acenaphthylene	< 0.03	< 0.03	< 0.03	3	170	S4UL	0
Anthracene	0.11	0.06	< 0.03	3	2400	S4UL	0
Benzo(a)anthracene	0.22	0.23	0.09	3	7.2	S4UL	0
Benzo(a)pyrene	0.16	0.24	0.08	3	5	C4SL	0
Benzo(b)fluoranthene	0.22	0.36	0.13	3	2.6	S4UL	0
Benzo(g,h,i)perylene	0.08	0.16	0.05	3	320	S4UL	0
Benzo(k)fluoranthene	0.09	0.11	0.04	3	77	S4UL	0
Chrysene	0.20	0.25	0.09	3	15	S4UL	0
Dibenzo(a,h)anthracene	< 0.03	< 0.03	< 0.03	3	0.24	S4UL	0
Fluoranthene	0.72	0.59	0.21	3	280	S4UL	0
Fluorene	0.07	0.04	< 0.03	3	170	S4UL	0
Indeno(1,2,3-c,d)pyrene	0.09	0.14	0.06	3	27	S4UL	0
Naphthalene	0.11	0.07	< 0.03	3	2.3	S4UL	0
Phenanthrene	0.37	0.26	0.08	3	95	S4UL	0
Pyrene	0.60	0.58	0.20	3	620	S4UL	0

None of the above values exceeded SGV values for residential land use with gardens.

Other Contaminants / Testing	WS5	WS7	WS11				
	0.50	0.50	0.50	Count	Adopted Guideline (mg/kg)	Source	Exceedances
Organic matter	1.90	3.40	3.70	3	-	-	-
pH	7.60	7.90	9.10	3	-	-	-
Sulphide	24.00	< 10	100.00	3	-	-	-
Cyanide, Total	0.20	0.40	0.30	3	-	-	-
Sulphur (free)	< 0.75	1.30	2.40	3	-	-	-
Sulphate Aqueous Extract as SO4	110.00	180.00	190.00	3	-	-	-

None of the above values give cause for concern.

In addition, the testing failed to record any asbestos within any of the samples.

6.0 Conclusion

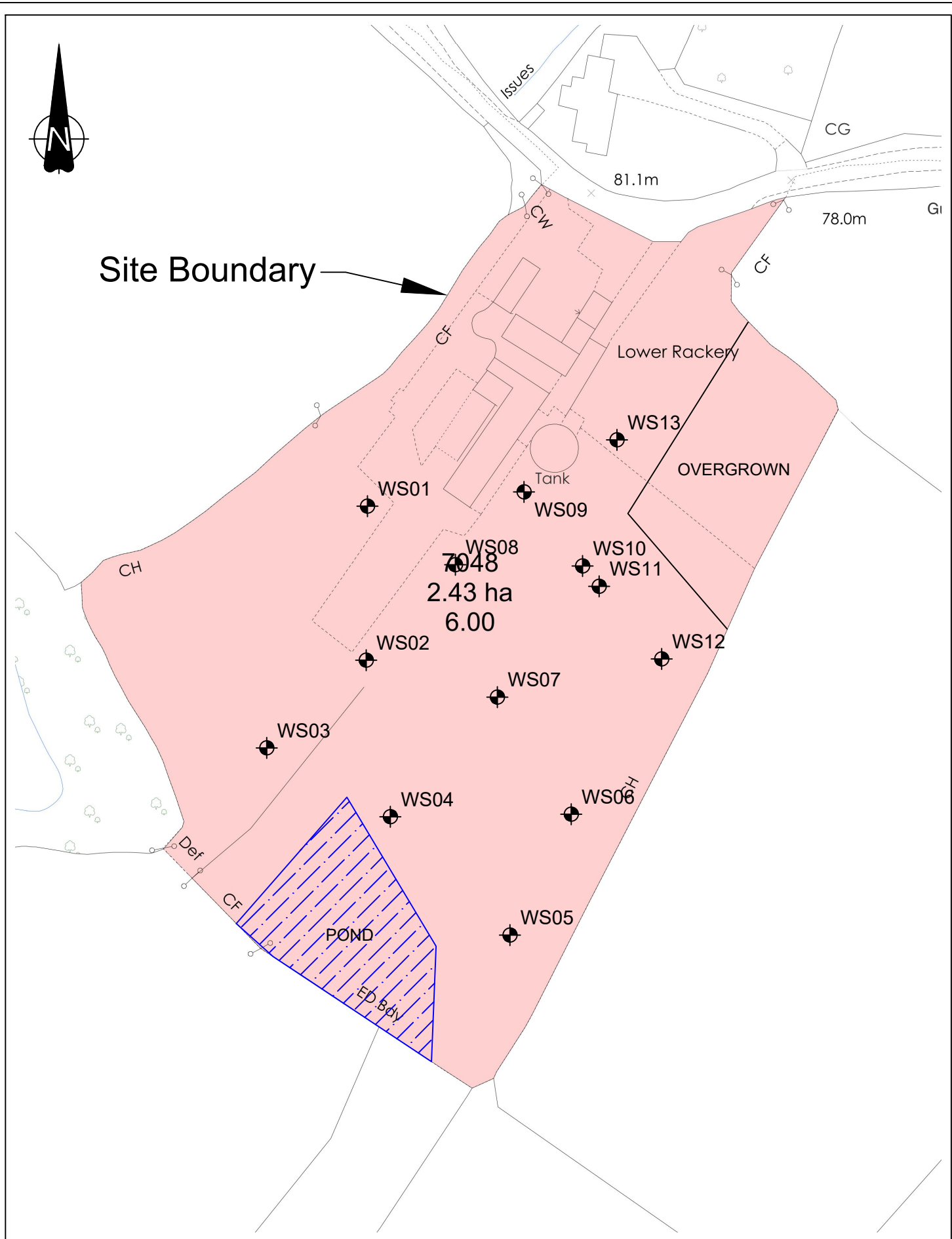
In conclusion, we have identified the made ground on site to be uncontaminated and does not exceed the adopted guidelines for a residential development with gardens. With no visual or olfactory evidence of contamination observed in the boreholes.

We trust this is satisfactory, should you have any queries please call Tyler Goodrick on 01244 661361.

Yours sincerely,

Tyler Goodrick.

FIGURES



SCALE 1:1250 @ A4

Figure Title
Existing Site Layout
& Borehole Location Plan

FIGURE 2

APPENDIX A

Borehole Logs

Percussion Drilling Log

Project Name: Lower Rackery Farm

Client: Mr Don Jones

Date: 23/03/2021

Location: Dark Lane, Llay

Contractor: Regional Drilling

Project No. : 2500

Crew Name: Liam

Drilling Equipment: Premier 110

Borehole Number
WS01Hole Type
WLS

Level

Logged By
TGScale
1:50Page Number
Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.15			Loose brown gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of brick and concrete. (MADE GROUND)	
					0.45				
					0.80			Loose brown slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone. (GLACIAL DEPOSITS)	1
								Medium dense brown clayey fine to coarse SAND. (GLACIAL DEPOSITS)	
								Medium dense brown fine to coarse SAND. (GLACIAL DEPOSITS)	
					2.00			End of Borehole at 2.000m	2
									3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm

Client: Mr Don Jones

Date: 23/03/2021

Location: Dark Lane, Llay

Contractor: Regional Drilling

Project No. : 2500

Crew Name: LIAM

Drilling Equipment: Premier 110

Borehole Number
WS02Hole Type
WLS

Level

Logged By
TGScale
1:50Page Number
Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			Loose brown gravelly clayey fine to coarse SAND. Gravel is angular to subangular fine to coarse of brick, concrete and tarmac. (MADE GROUND) Loose brown clayey slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone. (GLACIAL DEPOSITS) Medium dense greyish brown fine to coarse SAND. (GLACIAL DEPOSITS) Medium dense brown clayey fine to coarse SAND. (GLACIAL DEPOSITS)	1
					0.65				
					1.50				
					2.00				
							End of Borehole at 2.000m	2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

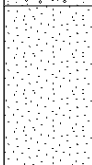
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
 No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm			Client: Mr Don Jones			Date: 23/03/2021		
Location: Dark Lane, Llay			Contractor: Regional Drilling					
Project No. : 2500			Crew Name: Liam			Drilling Equipment: Premier 110		
Borehole Number WS03		Hole Type WLS		Level		Logged By TG		Scale 1:50
								Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25			Grass over loose dark brown sandy SILT. (TOPSOIL)	1
								Firm brown mottled greyish brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and limestone. (GLACIAL TILL)	
								Loose orangish brown fine to coarse SAND. (GLACIAL DEPOSITS)	
					2.00		End of Borehole at 2.000m		2
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							10		

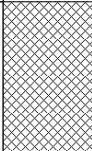
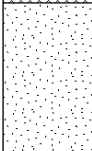
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS04	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.00			Firm dark brown slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick, wood and limestone. (MADE GROUND)	1
					2.00			Loose brown fine to coarse SAND. (GLACIAL DEPOSITS)	2
								End of Borehole at 2.000m	2
									3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

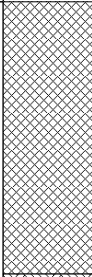
Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm			Client: Mr Don Jones			Date: 23/03/2021		
Location: Dark Lane, Llay			Contractor: Regional Drilling					
Project No. : 2500			Crew Name: Liam			Drilling Equipment: Premier 110		
Borehole Number WS05		Hole Type WLS		Level		Logged By TG		Scale 1:50
								Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Soft sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick, coal, wood and sandstone. (MADE GROUND)	1
					1.80			Soft brown sandy SILT with rootlets. (RELICT TOPSOIL)	2
					2.00			Very loose silty fine to coarse SAND. (GLACIAL DEPOSITS)	
					2.60			Medium dense reddish brown fine to coarse SAND. (GLACIAL DEPOSITS)	
					3.00			End of Borehole at 3.000m	3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

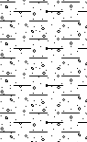
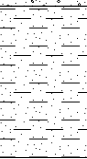
Remarks

Water strike at 2.40m.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS06	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.60			Medium dense dark brown sandy gravelly SILT. Gravel is angular to subangular fine to coarse of brick and limestone. (MADE GROUND)	
					1.00			Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone. (GLACIAL TILL)	1
					2.00			Firm brown sandy gravelly CLAY. Gravel is subrounded fine to coarse of sandstone. (GLACIAL TILL)	2
					3.00			Firm brown sandy CLAY. (GLACIAL TILL)	3
								End of Borehole at 3.000m	3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

Water strike at 2.50m.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS07	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.30			Soft dark brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick and concrete. (MADE GROUND)	1
					2.90			Firm dark brown to brown slightly gravelly slightly sandy CLAY. Gravel is subangular to subrounded fine to coarse of sandstone. (MADE GROUND)	2
					3.30			Soft dark brown slightly sandy SILT with rootlets. (RELICT TOPSOIL)	3
					3.70			Soft brown sandy CLAY. (GLACIAL TILL)	
					4.00			Firm light orangish brown mottled yellow sandy CLAY. (GLACIAL TILL)	4
								End of Borehole at 4.000m	
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS08	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.70			Medium dense dark brown sandy gravelly SILT with a low cobble content. Gravel is angular to subangular fine to coarse of concrete and sandstone. Cobbles are angular of concrete. (MADE GROUND)	1
					1.00			Firm brown sandy CLAY. (GLACIAL TILL)	
					2.00			Loose brown fine to coarse SAND. (GLACIAL DEPOSITS)	
								End of Borehole at 2.000m	2
									3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS09	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.90			Soft brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick and limestone. (MADE GROUND)	1
					2.00			Soft brown slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and coal. (GLACIAL TILL)	2
								End of Borehole at 2.000m	2
									3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS10	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.00 2.10			Soft dark brown to brown sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick, plastic, limestone and coal. (MADE GROUND)	1
								Refusal on wood. End of Borehole at 2.100m	2
									3
									4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS11	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Soft dark brown silty sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of brick and sandstone. (MADE GROUND)	1
									2
					2.70				
					2.90			Soft dark brown sandy SILT. (RELICT TOPSOIL)	
								Firm brown clayey fine to coarse SAND. (GLACIAL DEPOSITS)	3
					4.00			End of Borehole at 4.000m	4
									5
									6
									7
									8
									9
									10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

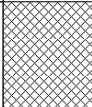
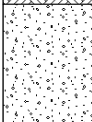
Remarks

No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS12	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.70			Medium dense dark brown sandy gravelly SILT. Gravel is angular to subangular fine to coarse of brick and limestone. (MADE GROUND)	
					1.20			Firm brown sandy CLAY with rootlets. (RELICT TOPSOIL)	1
					2.00			Loose brown gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone. (GLACIAL DEPOSITS)	2
								End of Borehole at 2.000m	2
									3
									4
									5
									6
									7
									8
									9
									10

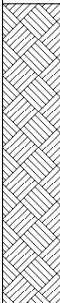
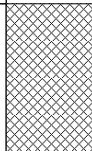
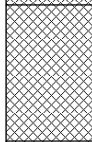
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks
No groundwater encountered.



Percussion Drilling Log

Project Name: Lower Rackery Farm		Client: Mr Don Jones		Date: 23/03/2021	
Location: Dark Lane, Llay		Contractor: Regional Drilling			
Project No. : 2500		Crew Name: Liam		Drilling Equipment: Premier 110	
Borehole Number WS13	Hole Type WLS	Level	Logged By TG	Scale 1:50	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description						
		Depth (m)	Type	Results										
					1.00			Firm brown sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of brick and sandstone. (MADE GROUND)	1					
								Loose dark brown slightly gravelly sandy SILT with a low cobble content. Gravel is angular to subangular fine to coarse of brick and concrete. Cobbles are angular of brick and concrete. (MADE GROUND)						
								Refusal on cobble.	2					
										1.90 2.00		End of Borehole at 2.000m		
														3
														4
														5
														6
														7
														8
														9
														10

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation

Remarks

No groundwater encountered.



APPENDIX B

Chemical Testing Results



Certificate of Analysis

Certificate Number 21-06994

Issued: 12-Apr-21

Client GroundSolve Limited
Unit 1
Well House Barns
Bretton
Flintshire
FAO Adam Fenwick
CH4 0DH

Our Reference 21-06994

Client Reference 2500

Order No (not supplied)

Contract Title Rackery Farm

Description 3 Soil samples.

Date Received 06-Apr-21

Date Started 06-Apr-21

Date Completed 12-Apr-21

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 21-06994

Client Ref 2500

Contract Title Rackery Farm

Lab No	1826539	1826540	1826541
Sample ID	WS5	WS7	WS11
Depth	0.50	0.50	0.50
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	23/03/2021	23/03/2021	23/03/2021
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	6.5	17	6.8
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.5	0.6	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	2.3	0.4
Chromium	DETSC 2301#	0.15	mg/kg	15	17	15
Chromium III	DETSC 2301*	0.15	mg/kg	15	17	15
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	20	92	20
Lead	DETSC 2301#	0.3	mg/kg	64	190	67
Mercury	DETSC 2325#	0.05	mg/kg	0.75	0.25	0.05
Nickel	DETSC 2301#	1	mg/kg	13	17	14
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	120	150	110
Inorganics						
pH	DETSC 2008#		pH	7.6	7.9	9.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.2	0.4	0.3
Organic matter	DETSC 2002#	0.1	%	1.9	3.4	3.7
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	110	180	190
Sulphide	DETSC 2024*	10	mg/kg	24	< 10	100
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	1.3	2.4
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	3.0
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	4.7
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	8.4
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	62
Aliphatic C35-C40	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	78
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	1.6
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	10
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	120
Aromatic C35-C40	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4	58
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	130
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	210
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	0.11	0.07	< 0.03

Summary of Chemical Analysis

Soil Samples

Our Ref 21-06994

Client Ref 2500

Contract Title Rackery Farm

Lab No	1826539	1826540	1826541
Sample ID	WS5	WS7	WS11
Depth	0.50	0.50	0.50
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	23/03/2021	23/03/2021	23/03/2021
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.06	0.04	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.07	0.04	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.37	0.26	0.08
Anthracene	DETSC 3303	0.03	mg/kg	0.11	0.06	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.72	0.59	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.60	0.58	0.20
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.22	0.23	0.09
Chrysene	DETSC 3303	0.03	mg/kg	0.20	0.25	0.09
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.22	0.36	0.13
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.09	0.11	0.04
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.16	0.24	0.08
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.09	0.14	0.06
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	0.16	0.05
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	3.1	3.1	1.0
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-06994

Client Ref 2500

Contract Title Rackery Farm

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1826539	WS5 0.50	SOIL	NAD	none	Colin Patrick
1826540	WS7 0.50	SOIL	NAD	none	Colin Patrick
1826541	WS11 0.50	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-06994
 Client Ref 2500
 Contract Rackery Farm

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1826539	WS5 0.50 SOIL	23/03/21	GJ 250ml, GJ 60ml x2, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
1826540	WS7 0.50 SOIL	23/03/21	GJ 250ml, GJ 60ml x2, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	
1826541	WS11 0.50 SOIL	23/03/21	GJ 250ml, GJ 60ml x2, PT 1L	Sulphur (free) (7 days), pH + Conductivity (7 days)	

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report