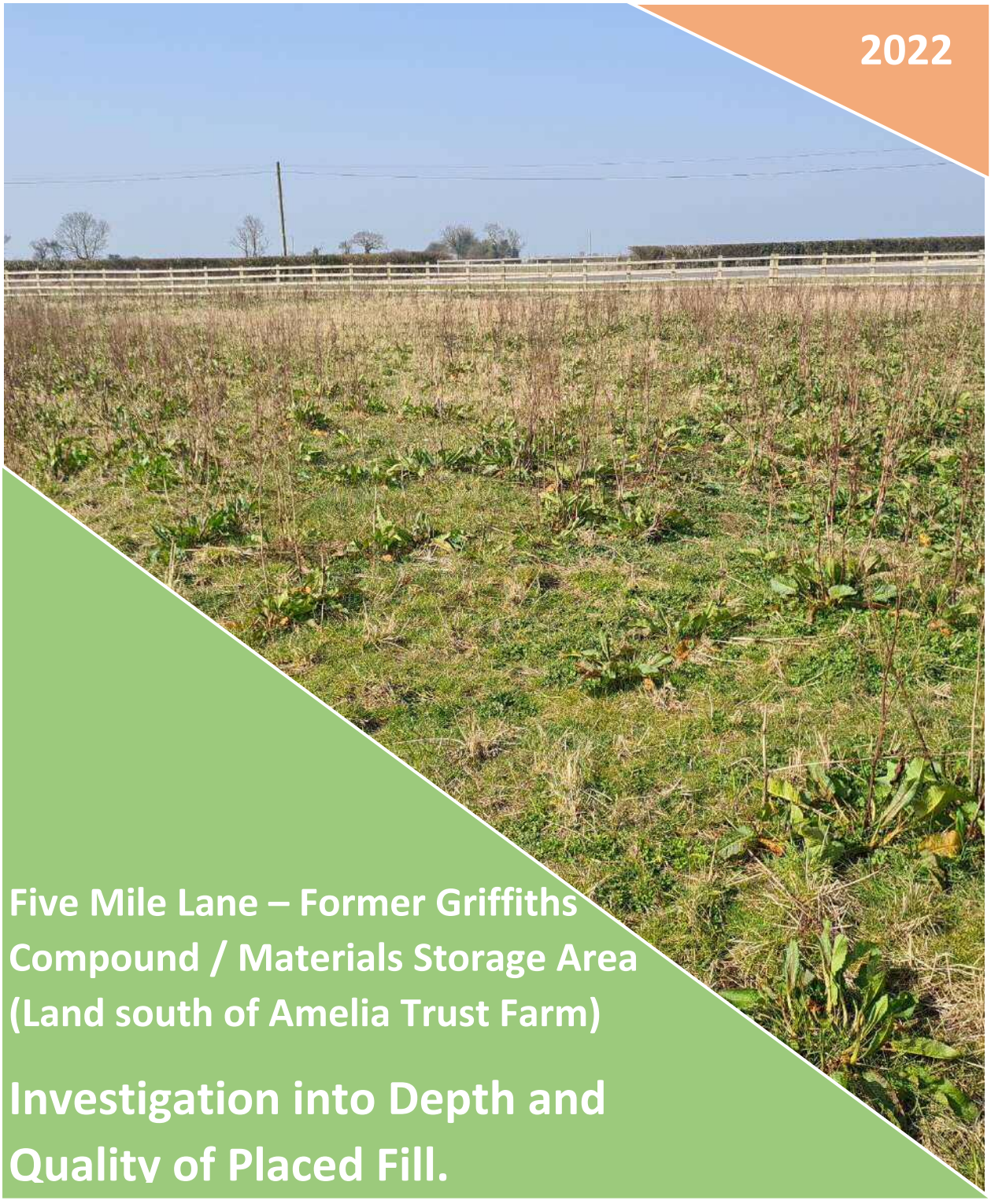
2022



Five Mile Lane – Former Griffiths Compound / Materials Storage Area (Land south of Amelia Trust Farm)

Investigation into Depth and Quality of Placed Fill.

EcoVigour
Integrated Environmental Management

DOCUMENT INFORMATION			
Project	Five Mile Lane – Former Griffiths Compound (Land south of Amelia Trust Farm)		
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Disclaimer

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1. Introduction

1.1.1 EcoVigour Ltd have been commissioned by Griffith Construction to undertake an assessment of ground conditions at their former compound site for the Five Mile Lane Improvement Scheme, at Dog Hill Farm adjacent to Five Mile Lane. The plot of land was used as a construction compound and for the storage of excavated materials during the construction of the Five Mile Lane highway scheme.

1.1.2 The plot was leased from the landowner for the storage of excavated materials during the construction of the new highway scheme. On completion of the works a volume of excavated materials remained at the plot. The plot slopes north to south but also sloped west to east from the original Five Mile Lane towards the embankment of the new carriageway. Under agreement with the landowner, surplus excavated material was used as fill to level the profile of the land so that it formed a more natural / useable profile into the new highway embankment.

1.1.3 This report details the findings of an intrusive ground investigation consisting of 15 machine dug trial pits, with soil samples taken from 9 of these. The 9 trial pits from which samples were taken, were those which were the most likely to contain pollutants i.e. trial pits dug around the periphery of the site, did not encounter made ground, although samples were taken from some of these as controls.

2. Site Details

2.1.1 The activity has been undertaken within an agricultural field next to Five Mile Lane, Vale of Glamorgan. The site does not have any designation but is part of Dog Hill Farm and lies between the old and new Five Mile Lane alighnments, south of the Amelia Farm Junction. For the purpose of this report the site will be referred to as Former Griffiths Compound and will henceforth be referred to as 'The Site'.

2.1.2 The site is centred around National Grid Reference ST 07787 71765

Figure 1: The Site Location

Figure 2: Site Extents

3. VISUAL ASSESSMENT OF THE SITE

3.1.1 A visual assessment was undertaken of the site on 22nd March 2022. This assessment consisted of a walkover of the site reviewing the following:

- The presence of anthropogenic materials / foreign objects on the surface of the site such as wood, reinforcing bar, concrete, bituminous bound materials, indicating buried objects – Several small sections of bituminous bound materials were noted around the site entrance, though to be related to the construction of the site entrance. A line of silt fence, which had fallen over and been trampled into the site was noted along the southern site boundary. No other anthropogenic materials were noted across the sites surface.
- The finish to the surface of the site – The sites surface is finished to an even profile but is locally un-even. There is an area of settlement across the gas main, across the northern section of the site, which can be seen when looking across the site There are some deep ruts crossing the site, which appear to be been created by 4 x 4 vehicles or tractors. The surface of the site is wet in places and holds water in places, which is to be anticipated for the clay soils encountered across the site.
- Amount of stone at the surface of the site - there is a significant amount of stone on the surface of the site, which appears to be indigenous local sandstone. The presence of this stone would make cultivation of the surface of the site difficult.

3.1.2 Prior to the construction of the Five Mile Road scheme, topographical surveys were undertaken along the line of the new carriageway, but these did not extend to cover the site. This will make comparison of levels across the site, pre and post scheme, difficult, unless the land owner has topographical information.

4. DESK STUDY

A limited Desk Study of the site, was undertaken, which was restricted to a review of historic aerial photographs, courtesy of Google Earth Pro.

4.1 GOOGLE EARTH

4.1.1 Reviewing Google Earth images of the site, they show usage of the site as agricultural land for the grazing of livestock. The surrounding area is also agricultural land.

Figure 3: Aerial Photo 1945 (courtesy Google Earth Pro)

Figure 4: Aerial Photo 2001 (courtesy Google Earth Pro)

Figure 5: Aerial Photo 2006 (courtesy Google Earth Pro)

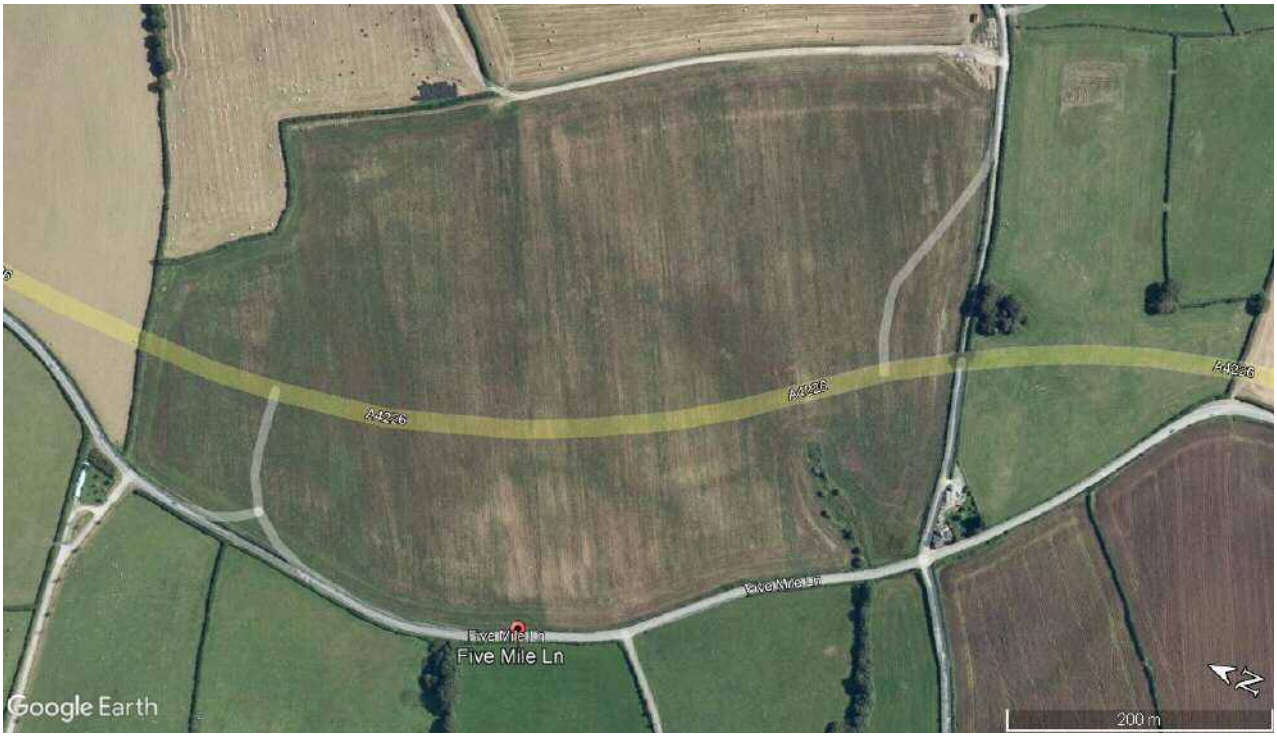


Figure 6: Aerial Photo 2009 (courtesy Google Earth Pro)

Figure 7: Aerial Photo 2016 (courtesy Google Earth Pro)

Figure 8: Aerial Photo 2018 (courtesy Google Earth Pro)

Figure 9: Aerial Photo 2019 (courtesy Google Earth Pro)

Figure 10: Aerial Photo 2020 (courtesy Google Earth Pro)

Figure 11: Aerial Photo 2021 (courtesy Google Earth Pro)

5. Ground Investigation

5.1.1 The site investigation consisted of:

- A walkover of the site, recording the general layout of the site, topography and looking for any indicators of contamination i.e. sheens on the surface of water, odours, discolouration, foreign objects.
- 15no machine dug trial pits, ranging in depth from 0.5m to 2m. A single soil sample was taken from 9no of these, which were sent for analysis for a range of common contaminated land elements / substances. A UKAS Accredited Laboratory was used for this. Only 9no samples were taken as, trial pits around the periphery of the site did not encounter made ground. Samples were taken from some of these, as controls.
- Samples were analysed for the following determinands:
-
- Ground water was encountered in two of the trial pits, no water samples were taken.

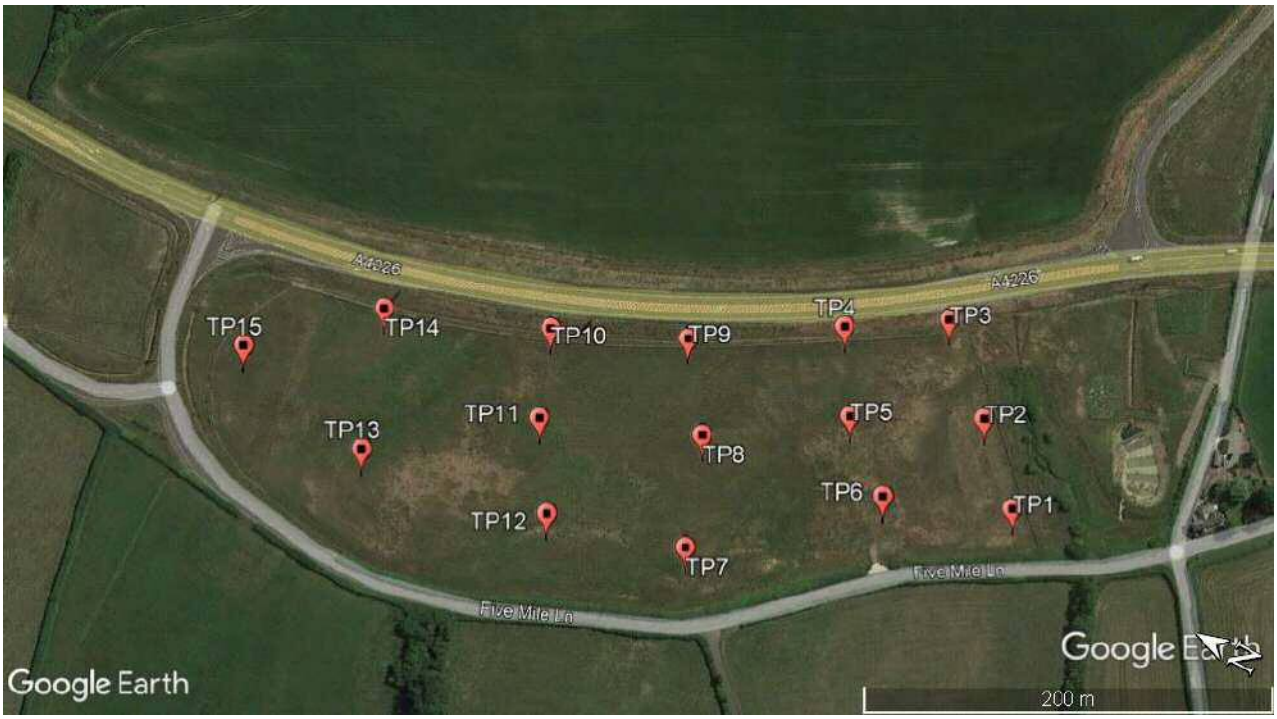


Figure 12: Trial Pit Locations overlain onto Aerial Image of Operational Site.

5.2 Trial Pit 1

5.2.1 Trial pit 1 was dug to a depth of 0.46m at the edge of the field. The top 0.30m of the hole was clean top soil and the bottom 0.16m of the hole was lightly coulered sandy loam soil. The sample was taken at a depth of 0.40m.

5.2.2 No ground water was encountered. 1no soil sample was taken from the sandy loam layer of the soil.

Trial Pit 1	
Grid Reference	ST 07829 71612
What3Words	Magnitude. Snowballs. Clubbing

Figure 13: Trial Pit 1

5.3 TRIAL PIT 2

5.3.1 Trial Pit 2 was dug to a depth of 0.52m. the top 0.18m was clean tops soil and the lower 0.34m consisted of light brown coloured sandy loam soil with nothing notable to be seen. A soil sample was taken at a depth of 0.45m. There was no water at this trial hole. The trial pit is on the northern boundary of the site and it is believed that soils encountered were indigenous to the plot.

Trial Pit 2	
Grid Reference	ST 07863 71644
What3Words	Banks. Discussed. Buzzing.

Figure 14: Trial Pit 2

5.4 TRIAL PIT 3

5.4.1 Trial Pit 3 was excavated to a depth of 0.6m near the southern boundary of the plot. The trial pit comprised 0.35m of clean light brown top soil, underlain by 0.25m of clean dark brown sandy clay with no evidence of made ground. A soil sample was taken at a depth of 0.52m and ground water was not encountered. It is likely that the soils encountered are indigenous to the site.

Trial Pit 3	
Grid Reference	ST 07900 71682
What3Words	Booklet. Lifeboats. Floating.

Figure 15: Trial Pit 3

5.5 TRIAL PIT 4

5.5.1 Trial Pit 4 was excavated at equal distances away from the centre of the site and the edge of the site, the pit was excavated to a depth of 1.2m. The top 0.3 meters of the trial pit was light to dark brown top soil. This was underlain by 0.4m of light brown coloured sandy loam with infrequent small sections of sandstone rock. Below this was 0.6m dark brown clay loam subsoil with approx. 30% angular / sub-angular sandstone cobbles. 0.6m of light brown clay with frequent sandstone. It was not possible to confirm whether materials encountered were indigenous or made ground as all were naturally occurring soils consistent with the area. A sample was taken at a depth of 1.15m and no ground water was identified.

Trial Pit 4	
Grid Reference	ST 07871 71728
What3Words	Equality. Stall. Momentous.

Figure 16: Trial Pit 4

Figure 17: Trial Pit 4

5.6 TRIAL PIT 5

5.6.1 Trial Pit 5 was excavated to a depth of 0.7m and was located at the edge of where it was anticipated that placed fill would be encountered. The top 0.4m of the pit was made up of light brown clay topsoil with frequent rootlets and occasional sandstone fragments. The lower 0.2m of the pit was Light brown clay soil with frequent (50%) sandstone fragments. The pit was terminated as it was believed that this was indigenous soil. The sample was taken at a depth of 0.5m no groundwater encountered.

Trial Pit 5	
Grid Reference	ST 07831 71704
What3Words	Dozen. Pounces. Forensic.

Figure 18: Trial Pit 5

Figure 19: Trial Pit 5

5.7 TRIAL PIT 6

5.7.1 Trial pit 6 was excavated near the gate that acts as the entrance and exit of the field and thus may be an area where there is likely to be material remaining from the construction of the site entrance. Small fragments of bituminous bound materials were noted on the surface of the site. The trial pit was excavated to a total depth of 0.8m. The top 0.2m of the trial pit consisted of a thin layer of light brown clay topsoil with frequent rootlets and occasional sandstone fragments. The middle 0.3m of the trial pit was made up of light brown sandy loam type soil. The bottom 0.3m of the trial pit was Light brown clay loam sub-soil with a high density of angular / sub-angular sandstone cobbles.

5.7.2 soil mixed with a very high density of sandstone fragments. The broken sandstone is likely naturally occurring but could be materials remaining from the access into the compound. The sample was taken at a depth of 0.6m and there was no ground water.

Trial Pit 6	
Grid Reference	ST 07803 71672
What3Words	Velocity. Dialects. Moisture.

Figure 20: Trial Pit 6

5.8 TRIAL PIT 7

5.8.1 Trial pit 7 was dug near to the entrance gate to the field and reached a depth of 0.65m. The top 0.2m of the trial pit was light brown clean top soil. The bottom 0.45m of the trial pit was light brown clay. The sample was taken at a depth of 0.4m and there was a small amount of surface water trickling into the trial pit.

Trial Pit 7	
Grid Reference	ST 07736 71753
What3Words	fountain.leopard.licks

Figure 21: Trial Pit 7

5.9 TRIAL PIT 8

5.9.1 Trial pit 8 was excavated in the centre of the site to a depth of 1.4m. The trial pit consisted of 0.15m of light brown clay loam topsoil, 0.40m of clay sub-soil with angular / sub-angular sandstone cobbles, 0.60m of light brown clay sub-soil with frequent angular / sub-angular sandstone cobbles, with occasional brick / tile fragments. This was underlain by 0.25m of dark black clay sub-soil. Trial pit terminated at 1.4m. Several pieces of wire were identified within the sub-soil. It is likely that this trial pit contains made ground, from fill placed at the site.

Trial Pit 8	
Grid Reference	ST 07787 71765
What3Words	Deleting. Shocked. Collects.

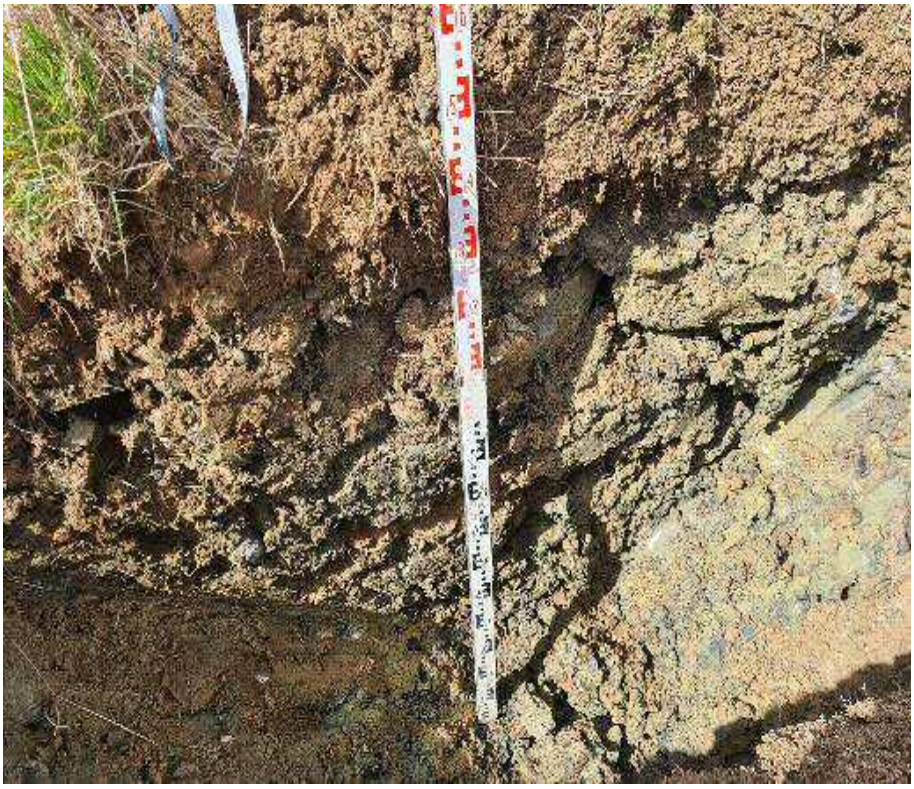


Figure 22: Trial Pit 8

Figure 23: Trial Pit 8

Figure 24: Trial Pit 8

5.10 TRIAL PIT 9

5.10.1 Trial pit 9 was excavated close to the eastern boundary of the plot. It was excavated to a depth of 1.00m. Soils within the trial pit were comprised of 0.20m of clay topsoil with frequent rootlets and occasional stone (sandstone), 0.55m of mid brown clay sub-soil with frequent angular / sub-angular sandstone and very occasions brick / tile fragments. Several sub-rounded sandstone boulders. This material appears to be made ground fill. This was underlain by clay sub-soil, which appears to be natural ground. Trial pit terminated at 1m, no groundwater encountered.

5.10.2 The 0.55m thick layer of clay sub-soil with sandstone cobbles and bounders appears to be placed material, although has probably been sourced locally to the site as was of same composition as indigenous materials.

Trial Pit 9	
Grid Reference	ST 07827 71794
What3Words	Volcanoes, Premiums, Attending

Figure 25: Trial Pit 9

5.11 TRIAL PIT 10

5.11.1 Trial pit 10 was excavated on the eastern boundary of the site, in the area, which it is assumed will be the deepest section of placed material (made ground). The trial pit consisted of the following soils, 0.20m of Clay loam topsoil with frequent rootlets and occasional sandstone, 0.40 of Sandy loam sub-soil with angular / sub-angular sandstone cobbles. No anthropogenic material notes, 0.40 of Mid brown clay sub-soil with angular / sub-angular sandstone cobbles and very occasional brick / tile fragments.

5.11.2 Soils appeared to be indigenous, with only indication that this may be made ground, being occasional brick / tile fragments. No ground water was encountered and the sample was taken at a depth of 0.7m

Trial Pit 10	
Grid Reference	ST 07798 71858
What3Words	Breaches, built, match

Figure 26: Trial Pit 10

Figure 27: Trial Pit 10

5.12 TRIAL PIT 11

5.12.1 Trial pit 11 was excavated in the centre of the plot to a depth of 0.8m. The soils within the trial pit consisted of 0.15m Clay loam topsoil, with frequent rootlets and stones, 0.55m of the trial pit consisted of uninterrupted natural looking clay sub-soil, 0.1m of clay with size range of angular / sub-angular sandstone. No anthropogenic materials encountered.

5.12.2 There was no water found in the trial hole and the soil sample was taken at a depth of 0.6m. Except for one brick / tile / tile fragment found, soils appeared to be indigenous.

Trial Pit 11	
Grid Reference	ST 07755 71841
What3Words	Forget, station, budgeted

Figure 28: *Trial pit 11*

5.13 TRIAL PIT 12

5.13.1 Trial Pit 12 was excavated approximately 30m from the western boundary. The intention being to try and identify the extent of placed fill within the plot. The trial pit was terminated at 0.65m. Soils in the trial pit comprised the following, 0.10m of light brown clay loam topsoil, with frequent rootlets, 0.55m of Light brown clay sub-soil with angular / sub-angular sandstone cobbles. Thin bands of a black coloured clay material were encountered. No odours were noted.

5.13.2 Soils appear to be naturally occurring and indigenous to the site. No ground water was encountered. A soil sample was taken at a depth of 0.4m where there was a band of black material running through the clay.

Trial Pit 12	
Grid reference	ST 07716 71814
What3Words	Unguarded, schooling, requests

Figure 29: *Trial pit 12*

Figure 30: *Trial pit 12*

Figure 31: *Trial pit 12, illustrating dark band of material.*

5.14 TRIAL PIT 13

5.14.1 Trial pit 13 was excavated on the western side of the site, south of the gas main, to a depth of 0.85m. Soils within the trial pit consisted of 0.20m of Sandy loam crumbly topsoil, with frequent rootlets, 0.65m of Light brown clay soil with small areas of black clay soil.Groundwater encountered at 0.8m bgl. Slow seepage rising to 0.8m bgl after 30 minutes. A soil sample was taken at 0.60m bgl.

Trial Pit 13	
Grid Reference	ST 07699 71911
What3Words	Span, moisture, frail

Figure 32: *Trial pit 13*

5.15 TRIAL PIT 14

5.15.1 Trial pit 14 was excavated near the eastern boundary, south of the gas main, to a depth of 0.90m. Soils in the trial pit consisted of 0.15m of sandy, clay, loam topsoil with frequent rootlets, 0.75m of Sandy clay sub-soil with angular / sub-angular sandstone cobbles and boulders. Materials appear to be indigenous except for one small piece of plastic encountered at approximately 0.40m.

5.15.2 No groundwater was encountered and a soil sample was taken at a depth of 0.60m.

Trial Pit 14	
Grid Reference	ST 07766 71936
What3Words	Undivided, plan, ages

Figure 33: *Trial pit 14*

Figure 34: *Trial pit 14*

Figure 35: *Trial pit 14 – plastic fragment.*

5.16 TRIAL PIT 15

5.16.1 Trial Pit 15 was excavated on the northern side of the gas main. From anecdotal information, it was unlikely that fill was placed within this area .The trial pit was terminated at 0.50mbgl.

5.16.2 dug on the other side of a gas main to the entrance of the field. The total depth of the trial hole was 0.50m. The top 0.25m of the trial hole was undisturbed light brown top soil. The bottom 0.25m of the trial hole was brown grey clay soil. The area looks natural which is likely due to the trial holes proximity to the gas main. No water was found and the soil sample was taken at a depth of 0.40m.

Trial pit 15	
Grid Reference	ST 07716 71988
What3Words	Traps, tweed, lift

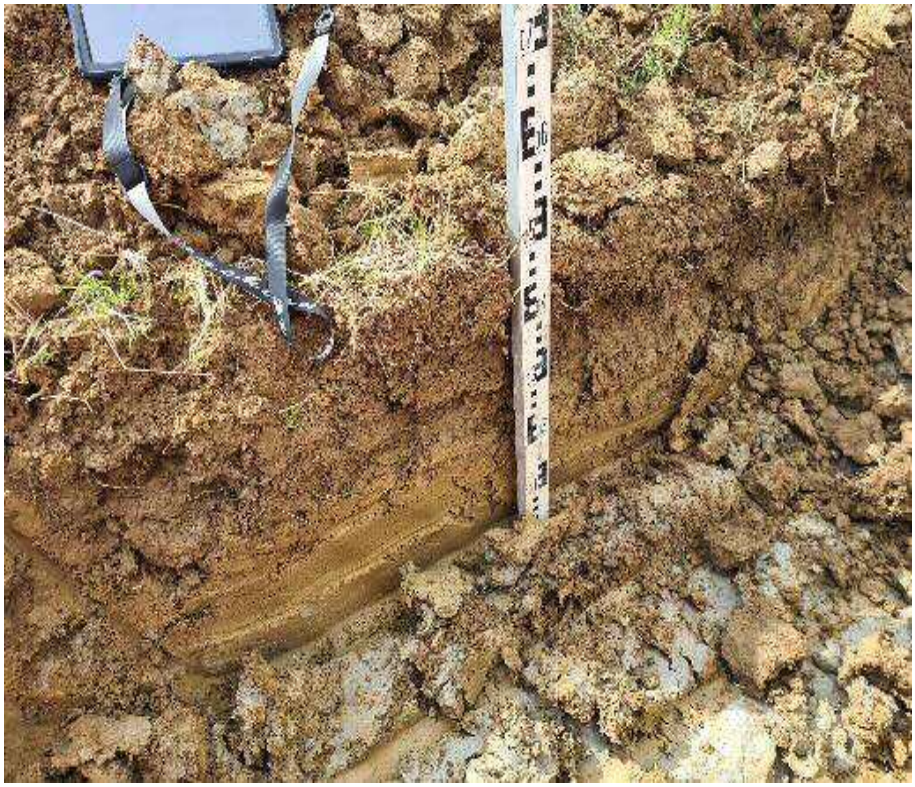


Figure 36: Trial pit 15

6. Chemical Sampling Results

6.1.1 A single soil sample was taken form each trial pit. Due to the homogenous nature of the materials across the site, it was decided to send 9 samples for laboratory analysis to a UKAS Accredited laboratory. Samples were analysed for a range of common, contaminated land indicators.

6.1.2 The results of the laboratory analysis have been screened against a set of human health Soil Screening Values for commonly encountered indicators of contaminated land. Screening values used were:

- Atkins AtRisk for a Commerical End Use for a soil with 6% Soil Organic Mater;
- Atkins AtRisk for a Residential with Plan Uptake End Use for a soil with 6% Soil Organic Mater;
- LQM/CIEH Suitable 4 Use Levels for an Allotment End Use.

Table 1: Laboratory analysis results:

Sample id			TP2	TP4	TP6	TP8	TP9	TP10	TP13	TP14	TP15	Atkins AtRisk Commercial 6% SOM	Atkins AtRisk Residential with Plant Uptake 6% SOM	LQM / CIEH Suitable 4 Use Levels – Allotment 2.5% SOM
Test	**Method**	**Units**												
Arsenic (total)	CE127 M	mg/kg As	13.7	17.3	14.5	9.9	9.4	10.5	17.4	12.8	10.5	640	32	43
Cadmium (total)	CE127 M	mg/kg Cd	0.6	3.0	1.2	0.4	0.7	0.4	0.6	0.3	0.4	230	10	4.9
Chromium (total)	CE127 M	mg/kg Cr	59.4	68.3	73.0	54.0	46.1	52.6	58.7	59.0	70.8	213000	12900	18000
Copper (total)	CE127 M	mg/kg Cu	28.5	41.2	52.4	25.5	24.3	26.0	26.1	28.5	30.1	109000	4020	520
Lead (total)	CE127 M	mg/kg Pb	29.2	536.7	36.3	32.5	28.2	30.6	37.3	20.4	19.3	2330	200	80
Mercury (total)	CE127 M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	26	1	19
Nickel (total)	CE127 M	mg/kg Ni	28.7	31.0	53.5	34.4	28.7	30.9	24.8	37.9	36.8	1800	130	53
Selenium (total)	CE127 M	mg/kg Se	2.2	2.4	7.7	2.0	1.7	1.9	2.6	2.4	3.0	13000	350	88
Zinc (total)	CE127 M	mg/kg Zn	82.1	439.8	107.7	91.4	94.1	99.1	86.6	59.7	62.8	< 1kg/kg	17200	620
pH	CE004 M	units	9.0	8.7	8.3	8.1	8.6	8.0	7.9	8.1	8.3			
Sulphate (total)	CE062 M	mg/kg SO_4	355	772	324	630	967	1442	831	1063	278			
Sulphur (total)	CE119	mg/kg S	218	519	118	479	982	1043	443	3855	204			
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	<1	<1	<1	<1	34	34	
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3200	420	140
PAH														

Sample id			TP2	TP4	TP6	TP8	TP9	TP10	TP13	TP14	TP15	Atkins AtRisk Commercial 6% SOM	Atkins AtRisk Residential with Plant Uptake 6% SOM	LQM / CIEH Suitable 4 Use Levels – Allotment 2.5% SOM
Naphthalene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	22700	8.71	10
Acenaphthylene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			69
Acenaphthene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.03	0.04	<0.02	<0.02	<0.02	106000	2130	85
Fluorene	CE087 U	mg/kg	<0.02	<0.02	<0.02	<0.02	0.03	0.03	<0.02	<0.02	<0.02	72100	1930	67
Phenanthrene	CE087 M	mg/kg	<0.02	<0.02	<0.02	0.07	0.34	0.35	<0.02	<0.02	<0.02			38
Anthracene	CE087 U	mg/kg	<0.02	<0.02	<0.02	0.03	0.11	0.08	<0.02	<0.02	<0.02	545000	18300	950
Fluoranthene	CE087 M	mg/kg	<0.02	0.05	<0.02	0.21	0.83	0.62	0.02	<0.02	<0.02	72700	2160	130
Pyrene	CE087 M	mg/kg	<0.02	0.04	<0.02	0.18	0.58	0.50	<0.02	<0.02	<0.02	54500	1550	270
Benzo(a)anthracene	CE087 U	mg/kg	<0.02	<0.02	<0.02	0.10	0.45	0.32	<0.02	<0.02	<0.02	142	8.54	6.5
Chrysene	CE087 M	mg/kg	<0.03	<0.03	<0.03	0.13	0.37	0.26	<0.03	<0.03	<0.03	14300	927	9.4
Benzo(b)fluoranthene	CE087 M	mg/kg	<0.02	0.05	<0.02	0.17	0.60	0.44	<0.02	<0.02	<0.02	144	9.86	2.1
Benzo(k)fluoranthene	CE087 M	mg/kg	<0.03	<0.03	<0.03	0.04	0.18	0.17	<0.03	<0.03	<0.03	1440	100	75
Benzo(a)pyrene	CE087 U	mg/kg	<0.02	0.02	<0.02	0.10	0.37	0.29	<0.02	<0.02	<0.02	14.4	0.998	2
Indeno(123cd)pyrene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.33	0.22	<0.02	<0.02	<0.02	144	9.75	21
Dibenz(ah)anthracene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.07	0.04	<0.02	<0.02	<0.02	14.4	1	0.27
Benzo(ghi)perylene	CE087 M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.24	0.18	<0.02	<0.02	<0.02	1450	103	470
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	<0.34	<0.34	1.03	4.53	3.55	<0.34	<0.34	<0.34			
TPH														
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			27

Sample id			TP2	TP4	TP6	TP8	TP9	TP10	TP13	TP14	TP15	Atkins AtRisk Commercial 6% SOM	Atkins AtRisk Residential with Plant Uptake 6% SOM	LQM / CIEH Suitable 4 Use Levels – Allotment 2.5% SOM
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			51
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			21
EPH Aromatic (>EC10-EC12)	CE250	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1			31
EPH Aromatic (>EC12-EC16)	CE250	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1			57
EPH Aromatic (>EC16-EC21)	CE250	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1			110
EPH Aromatic (>EC21-EC35)	CE250	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1			820
EPH Aromatic (>EC35-EC44)	CE250	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1			820
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			1700
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			5600
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			770
EPH Aliphatic (>C10-C12)	CE250	mg/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6			4400
EPH Aliphatic (>C12-C16)	CE250	mg/kg	<6	<6	<6	<6	<6	<6	<6	<6	<6			13000
EPH Aliphatic (>C16-C35)	CE250	mg/kg	<15	<15	<15	<15	<15	<15	<15	<15	<15			270000
EPH Aliphatic (>C35-C44)	CE250	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10			270000
Subcontracted analysis														
Asbestos (qualitative)	$	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD			

7. DISCUSSION

7.1.1 During the ground investigation, limited evidence of made ground was identified. Areas of potential fill were located along the eastern and central sections of the site, predominantly within Trial Pits – TP4, TP5, TP8, TP9, TP10 and TP11. Fill areas were not readily recognisable as fill materials used were indigenous to the area.

7.1.2 Anthropogenic materials were identified in the following trial pits:

- TP8 – very occasional (3) brick / tile fragments;
- TP9 – very occasional (3) brick / tile fragments;
- TP10 – very occasional (3) brick / tile fragments;
- TP14 – small pieces of plastic sheet.

7.1.3 Apart from these, materials appeared to be naturally occurring. Some of the trial pits had layers of soils with high sandstone content but these did not appear to be hard standing.

7.1.4 No evidence of contaminated land was encountered i.e. odours, discoloration, sheens. Bands of black clay were encountered in TP12 and TP13 but this appeared natural with no odour, when rubbed between fingers.

7.1.5 Groundwater was encountered in TP13 at 0.8m, which after 30 minutes rose to a depth of 5cm. This was believed to be localised perched groundwater sat on a band of clay and seeping through stone lenses.

7.1.6 The results from the laboratory analysis screened well against the Soil Screening Values (SSV), with only one exceedance noted. The sample taken from TP4 was taken at 1.15m below ground level and has an exceedance for lead against the Residential with Plant Uptake and Allotment SSV. The results was Lead 536.7mg/kg, against an Atkins AtRisk SSV for Residential with Plant Uptake of 200mg/kg and Residential without Plant Uptake of 310mg/kg and a LQM/CIEH Suitable 4 Use Levels for an Allotment End Use SSV of 80mg/kg. This result is an outlier, with the other results being consistent and the next highest reading being 37.3mg/kg. Due to the depth at which the sample was taken, the nature of the soil (clay) and the anomalous nature of the reading, we do not believe that this poses a risk to human health or controlled waters.

8. CONCLUSION

8.1.1 From investigations undertaken it appears that there is a layer of placed fill across the eastern section of the site, which tapers towards the southern and western boundaries and the gas main crossing the site in an east – west direction across the northern section of the site.

8.1.2 All materials in all trial pits appear to be clean naturally occurring, indigenous materials, with minimal anthropogenic materials. Brick / tile fragments could be from previous surface drainage across the site.

8.1.3 The results of laboratory analysis, did not identify any indicators of contamination.

APPENDIX 4 – TRIAL PIT LOGS

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 1**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07829 71612**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfil	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Total depth of the trial pit 0.46m Soil samples taken at 0.4	1	Soil	Refer to lab results	No	Yes	Clean brown topsoil	0.30
						Light coloured sandy loam soil with occasional angular / sub-angular sandstone cobbles.	0.16

Plan (Not to scale)

General Remarks

This trial pit is at the bottom of the field, close to the boundary so there is unlikely to be fill materials here. Materials encountered are likely to be indigenous soils.

All dimensions in metres **0.8 by 1.2**

Scale:

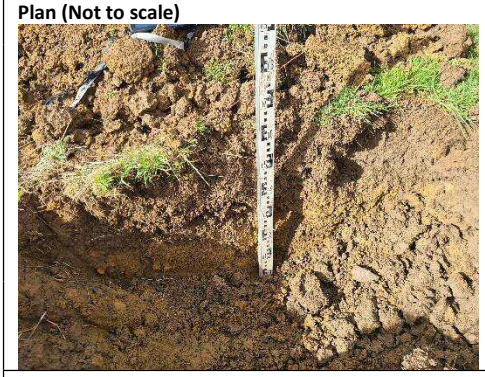
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by:

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 2**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07863 71644**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial Pit terminated: 0.52m Soil samples taken at a depth of: 0.45m	1	Soil	Refer to lab results	No	Yes	Light brown clay topsoil, with frequent rootlets and occasional stone.	0.18
						Light brown coloured sandy loam sub-soil, with angular / sub-angular sandstone cobbles.	0.34

Plan (Not to scale)



General Remarks

This trial pit is on the fringe of the sight so is expected to contain no fill material. Soils encountered appear to be indigenous.

All dimensions in metres: **0.85 by 1.65**

Scale:

Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 3**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07900 71682**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.60m The soil samples were taken at a depth of 0.52m	1	Soil	Refer to lab results	no	yes	Light brown clay topsoil, with frequent rootlets and occasional sandstone, stone.	0.35
						Dark brown sandy clay sub-soil, with occasional angular / sub-angular sandstone cobbles.	0.25

Plan (Not to scale)

General Remarks

This trial pit was near the southern boundary of the plot. This area is unlikely to have received fill materials and hence soils noted are likely indigenous.

All dimensions in metres: **1.3 by 0.8**

Scale:

Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 4**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07871 71728**	Sheet: **1 of 1**

Samples and In-situ Tests				Wate r	Backfi ll	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 1.20m The depth at which the soil samples were taken was 1.15	1	Soil	Refer to lab results	no	yes	Light brown clay loam topsoil, frequent rootlets.	0.3
						Light brown coloured sandy loam with infrequent small sections of sandstone rock.	0.3
						Dark brown clay loam subsoil with approx. 30% angular / sub-angular sandstone cobbles.	0.4
						Clay with high proportion of broken angular sandstone.	0.2

Plan (Not to scale)

General Remarks

It is unknown whether the layer of broken sand stone at the base of the trial pit is natural or remains of the old compound.

All dimensions in metres: **0.85 by 2.80**

Scale:

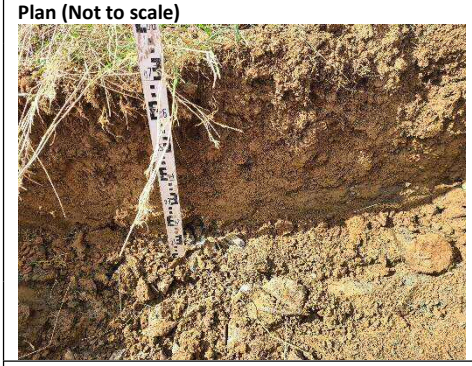
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 5**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07831 71704**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfil	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.70m The depth at which the samples were taken was 0.50m	1	Soil	Refer to lab results	no	yes	Light brown clay topsoil with frequent rootlets and occasional sandstone fragments.	0.40
						Light brown clay soil with sandstone fragments.	0.30

Plan (Not to scale)



General Remarks

The soil was good looking with no abnormalities of sight or smell.

All dimensions in metres: **0.65 by 2.60**

Scale:

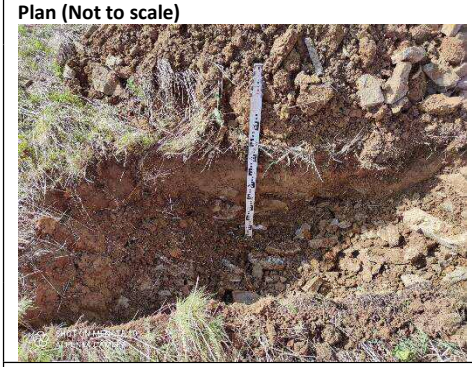
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 6**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07803 71672**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfil	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.80m The depth at which the soil samples were taken was 0.60	1	Soil	Refer to lab results	no	yes	Light brown clay topsoil with frequent rootlets and occasional sandstone fragments	0.20
						Light brown sandy loam soil	0.30
						Light brown clay loam sub-soil with a high density of broken sandstone.	0.30
						No groundwater encountered.	

Plan (Not to scale)



General Remarks

The rocks and stones in the bottom layer of the soil are not likely to be fill as they are rounded instead of crushed.

All dimensions in metres: **0.9 by 2.30**	Scale:

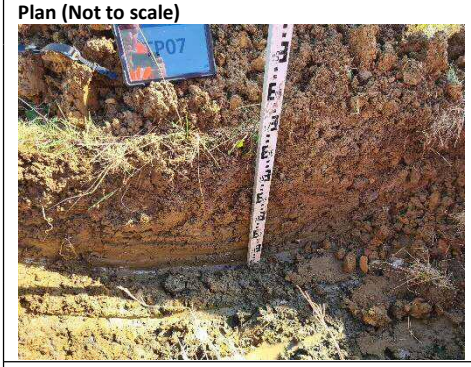
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 7**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: ST 07736 71753	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfil	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.65m The depth at which the samples were taken was 0.40m	1	Soil	Refer to lab results	Yes	Yes	Light brown topsoil with frequent rootlets and occasional sandstone fragments.	0.20
						Light brown clay loam sub-soil, with occasional stone.	0.45
						No groundwater encountered.	

Plan (Not to scale)



General Remarks

Trial pit terminated at 0.65m as believed to be indigenous soils. No groundwater encountered.

All dimensions in metres: **0.9 by 2.4**

Scale:

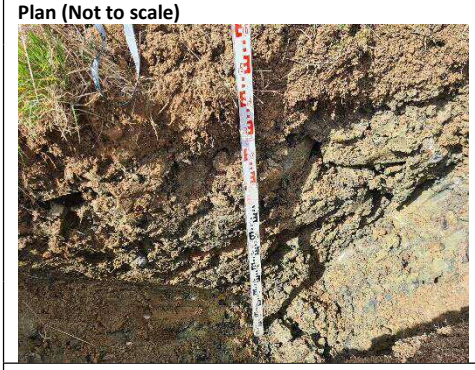
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 8**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07787 71765**	Sheet: **1 of 1**

Samples and In-situ Tests				Wate r	Backfi ll	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 1.4m The depth at which the samples were taken was 0.9m	1	Soil	Refer to lab results	No	Yes	Light brown clay loam topsoil	0.15
						Clay sub-soil with angular / sub-angular sandstone cobbles	0.40
						Clay soil with angular / sub-angular sandstone cobbles and very occasional brick fragments.	0.60
						A layer of dark black clay soil	0.25

Plan (Not to scale)



General Remarks

There was a high density of angular / sub-angular sandstone with very occasional anthropogenic materials including several fragments of wire and brick. No odours or other evidence of contamination was identified.

All dimensions in metres: **0.7 by 3.00**

Scale:

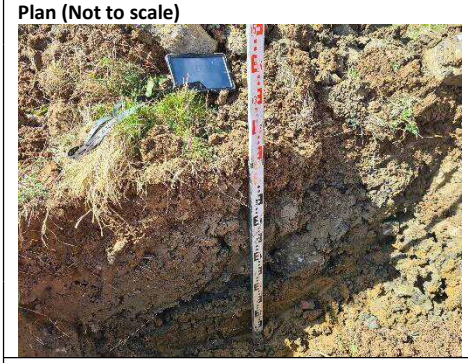
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 9**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07827 71794**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 1.00m Sample taken at 0.60m	1	Soil	Refer to lab results	No	Yes	Clay topsoil with frequent rootlets and occasional stone (sandstone)	0.20
						Mid brown clay sub-soil with frequent angular / sub-angular sandstone and very occasions brick fragments. Several sub-rounded sandstone boulders.	0.55
						Clay sub-soil	0.25

Plan (Not to scale)



General Remarks

The 0.55m thick layer of clay sub-soil with sandstone cobbles and bounders appears to be placed material, although has probably been sourced locally to the site as was of same composition as indigenous materials.

All dimensions in metres: **0.8 by 2.30**

Scale:

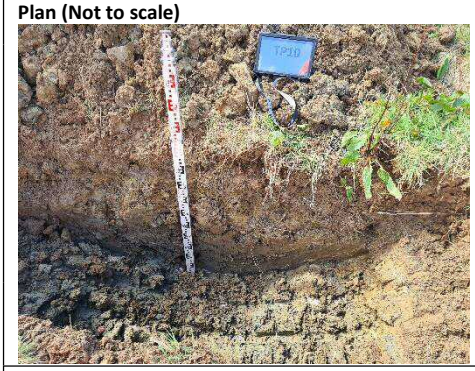
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 10**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07798 71858**	Sheet: **1 of 1**

Samples and In-situ Tests				Wate r	Backfi ll	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 1.00m Sample taken at 0.70m	1	Soil	Refer to lab results	No	Yes	Clay loam topsoil with frequent rootlets and occasional sandstone.	0.20
						Sandy loam sub-soil with angular / sub-angular sandstone cobbles. No anthropogenic material notes.	0.40
						Mid brown clay sub-soil with angular / sub-angular sandstone cobbles and very occasional brick fragments.	0.40

Plan (Not to scale)



General Remarks

Soils appeared to be indigenous, with only indication that this may be made ground, being occasional brick fragments.

All dimensions in metres: **0.7 by 2.4**

Scale:

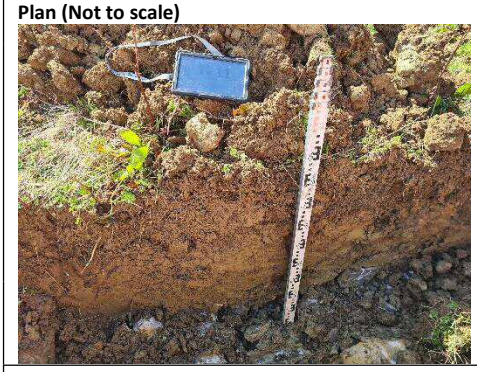
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 11**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07755 71841**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.80m Sample taken at 0.60m	1	Soil	Refer to lab results	No	Yes	Clay loam topsoil, with frequent rootlets and stones.	0.15
						Clay sub-soil	0.55
						Clay with size range of angular / sub-angular sandstone. No anthropogenic materials encountered.	0.10

Plan (Not to scale)



General Remarks

Apart from one fragment of brick found within the clay soil, no anthropogenic materials were encountered. It was not possible to determine whether soils were indigenous or made ground.

All dimensions in metres: **0.65 by 2.50**

Scale:

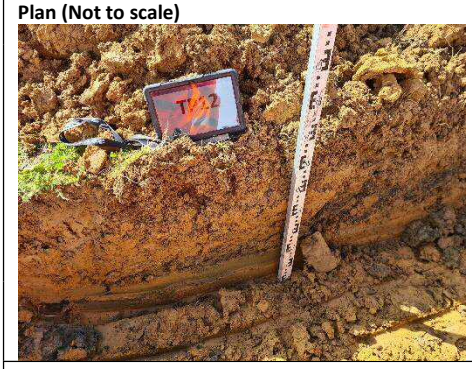
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Alun Griffiths Construction**	Trial pit: **TP 12**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07716 71814**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.65m Sample taken at 0.40m (where there is a black streak in the clay soil)	1	Soil	Refer to lab results	No	Yes	Light brown clay loam topsoil, with frequent rootlets.	0.10
						Light brown clay sub-soil with angular / sub-angular sandstone cobbles. Thin bands of a black coloured clay material were encountered. No odours were noted.	0.55

Plan (Not to scale)



General Remarks

Looks entirely natural.

All dimensions in metres: **0.8 by 2.4**

Scale:

Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 13**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07699 71911**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.85m Sample taken at 0.60m	1	Soil	Refer to lab results		Yes	Sandy loam crumbly topsoil, with frequent rootlets.	0.20
						Light brown clay soil with small areas of black clay soil	0.65
				0.80		Groundwater encountered at 0.8m bgl. Slow seepage rising to 0.8m bgl after 30 minutes.	

Plan (Not to scale)

General Remarks

There was a small amount ground water seepage rising to 5cm deep, seeping through the base of the trial pit. No anthropogenic materials encountered.

All dimensions in metres: **0.7 by 2.55**

Scale:

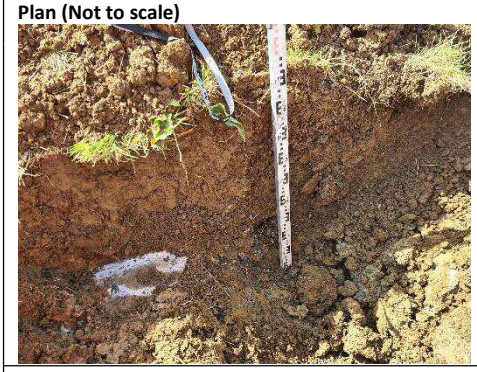
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 14**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07766 71936**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.90m Sample taken at 0.60	1	Soil	Refer to lab results	No	Yes	Sandy, clay, loam topsoil with frequent rootlets.	0.15
						Sandy clay sub-soil with angular / sub-angular sandstone cobbles and boulders	0.75

Plan (Not to scale)



General Remarks

Materials appear to be indigenous except for one small piece of plastic encountered at approximately 0.40m.

All dimensions in metres: **1.2 by 2.3**

Scale:

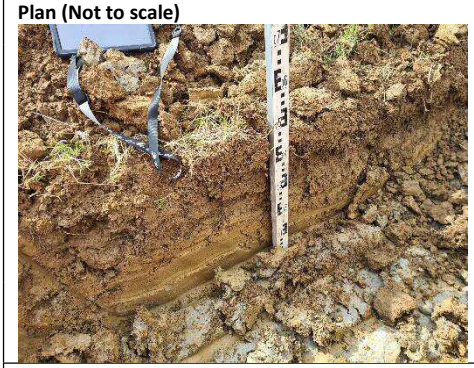
Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**

Contract: **Cardiff – 5 Mile Lane Investigation of Reinstated Agricultural Land**	Client: **Griffiths Construction**	Trial pit: **TP 15**

Contract Ref: **J000878**	Date: **07/04/2022**	Ground Level (m):	National Grid Co-ordinate: **ST 07716 71988**	Sheet: **1 of 1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness) (m)
Depth (m)	**No**	**Type**	**Results**				
Trial pit terminated at 0.50m	1	Soil	Refer to lab results	No	Yes	Sandy, clay loam topsoil with frequent rootlets.	0.25
						Brown clay sub-soil with angular sandstone cobbles.	0.25

Plan (Not to scale)



General Remarks

Indigenous ground

All dimensions in metres: **0.85 by 2.4**

Scale:

Method Used: **Machine Dug**	Plant Used: **Excavator**	Logged By: **Callum Hole**	Checked by: **J Gregory**