



**Ryefield Farm House
Woodgate**

***Borehole Logs, Infiltration Test Information
and
Winter Groundwater Monitoring Results***

Prepared by:
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KNC2111/DS

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Ground Water Monitoring-Ryefields Farmhouse

Date	05/01/2021	05/02/2021	17/02/2021	05/03/2021	15/03/2021
	GWT	GWT	GWT	GWT	GWT
	(m bgl)	(m bgl)	(m bgl)	(m bgl)	(m bgl)
Trial Hole					
WS1	0.09	0.74	0.98	1.4	1.5
WS2	0.31	1	1.3	1.4	1.5
WS3	0.37	0.9	1.2	1.4	1.55

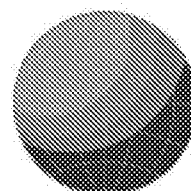


Insitu Testing Report

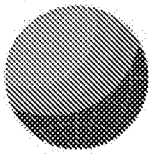
Report Reference P21.109A/ITR

Land to the West of Ryefield Farmhouse, Chichester - Soakage Testing

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Report Approval

Report Author(s)	Signature	Date
Rob Marsh BSc FGS Engineering Geologist, Director		30/01/2021
Report Approved		Date
Shaun Gilbrook BSc FGS Engineering Geologist, Director		30/01/2021
Revision – Requested by	Nature of Revision	Date

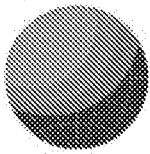


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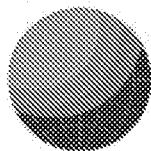
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Appendix B – Insitu Test Results and Stratigraphic Logs

Appendix C – Photographs



Trading Terms

Unless specifically stated within the tender/quotation or unless identified within the introduction to this report it is confirmed that this report has been compiled wholly in accord with Impact Geotechnical Ltd's terms of engagement. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.

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Context

This report is written in the context of an agreed scope of work between Impact Geotechnical Ltd and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the report in whole or part may be necessary after its original submission.

Professional Interpretation

The recommendations made and opinions expressed in the report are based on the conditions revealed by the site works together with an assessment of the data from the insitu and laboratory testing or in respect of the desktop reports. No responsibility can be accepted for conditions that have not been revealed by the research, site works and testing.

The Client is advised that the conditions observed on site by Impact Geotechnical Ltd at the time of any site survey may be subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance and they may subsequently have become evident. It is not possible to assess areas which are inaccessible or where access is not granted and IGL accept no liability for risks subsequently identified therein.

The Conceptual Model, Risk Assessment and sampling regime has been formulated in accordance with current UK guidance at time of production based upon the relevant information gained from Stage1, Stage 2 and Stage 3 Risk Assessments. While the model and assessment offer opinions and interpretations of these guidelines, the comments made are for guidance only and no liability can be accepted for their accuracy. It is possible that aspects of Geo-environmental reports may need to be altered following consultation with the statutory regulatory bodies to suit planning requirements.

Intrusive Field Operations

The data collected through direct operations in the production of this report has been so obtained, unless directly otherwise stated, in accordance with current UK guidance, law or accepted industry practice, including but not limited to: BS.5930: 1990 Code of Practice for Site Investigations (Amendment 3: 2015+A1:2020), & BS.10175: 2011 + A2: 2017 Investigations into Potentially Contaminated Sites. Exact exploratory locations will depend upon access conditions, site use and plant capability, IGL do not accept liability for issues arising from material identified between or outside of the area of exploratory locations.

Laboratory Testing

Unless stated otherwise within the text, all geotechnical and material laboratory tests have been performed in accordance with the relevant British Standard Documents. Laboratory testing for contaminated land assessment is completed under the UKAS / MCERTS accreditation schemes, unless identified as otherwise in the report.

Human Health Risk Assessment Criteria

The Environment Agency has undertaken revision of the Soil Guideline Values (SGVs) which are partially complete. Where standards are available using the "new" approach, these have been utilised for correlative purposes. Where standards have not yet been revised, guidance following the "old" approach has been utilised. Please note that upon release of the remaining guidelines, the standards contained within this report may be subject to change. In addition, the second edition of the LQM CIEH guidance has now been released and will be utilised in favour of previously published guideline values.

Third Parties

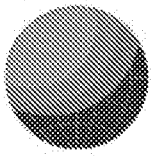
The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous Site investigations and chemical testing laboratories. IGL has assumed that such information is correct. IGL cannot and does not guarantee the authenticity or reliability of the information it has relied upon and can accept no responsibility for inaccuracies with the data supplied by other parties.

The accuracy of the historical map extracts supplied cannot be guaranteed and it should be noted that different conditions may have existed between mapping sheet editions. Therefore, there can be no certainty that all areas of contamination have been identified during the Stage 1: Tier 1 Preliminary Risk Assessment.

Definitions

Reference to the word "contamination" in this report does not relate to the statutory definition of contaminated land under 1990 Environmental Protection Act unless otherwise stated. The definition used in this report is: "Land that contains substances that, when present in sufficient quantities or concentrations, are likely to cause harm, directly or indirectly, to man, to the environment, or on occasion to other targets" (NATO CCMS, 1985).

IGL 2020



1.0 INTRODUCTION

Impact Geotechnical Ltd (IGL) were instructed by Domusea Developments (the Client) (Q20.360.3, December 2020), to carry out soil infiltration testing and install winter groundwater monitoring standpipes at a site know as Land to the west of Ryefield Farmhouse, Lidsey Road, Woodgate, Chichester, West Sussex, PO20 3ST (hereafter referred to as the "site").

It is understood that this site requires groundwater levels records and soil infiltration evaluation and as such this investigation is intended to provide information on soil infiltration rates of the shallow soils encountered on site to aid in the design of soakage solutions for the site. Furthermore groundwater monitoring standpipes were installed to allow for subsequent groundwater level monitoring (to be completed by others).

2.0 SCOPE

In order to allow for winter groundwater monitoring to be completed on the plot, 3No groundwater standpipe installations were constructed within windowless sample borehole to depths of 4.00mbgl. Subsequent monitoring is to be completed by others.

Additionally, and to provide initial information for the drainage designs for the new development it was agreed with the client that insitu testing comprising of 1no. bespoke soil infiltration test in general accordance with the BRE 365 specification would be conducted.

3.0 FIELDWORKS AND RESULTS

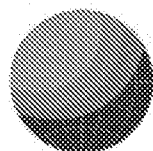
The following site works were completed on 26th January 2021, supervised by an Engineer from IGL.

3.1 Winter Groundwater Installations

3No groundwater monitoring standpipes were installed on the Land to the west of Ryefield Farmhouse site to allow for future winter groundwater monitoring to be completed (by others).

The standpipes were installed within window sample boreholes to depths 3.80-4.00mbgl using 35mm diameter standpipe. 1.00m plan sections of pipe were installed from ground level with the remaining pipework composed of slotted pipe with a geotextile sock. Clean/washed 10mm diameter pea shingle was used to provide a filter pack around the slotted section of pipe with a bentonite seal created from 1.00mbgl back to 0.30mbgl to seal out any surface water.

Upon completion each installation was fitted with an end cap and lockable flush stopcock cover. The installation locations can be found in the hole location plan found in Appendix A with the stratigraphic borehole logs contained within Appendix B.



3.2 Soil Infiltration Testing

Trial pits were hand excavated to allow subsequent soil infiltration testing. Ground conditions were as follows:

Stratum	Depth Encountered	Range	Detail Description
Topsoil/Made Ground	GL to 0.15-0.20m		Grass over brown sandy Silt/Clay. Sand is fine. Rare subangular to subrounded fine to medium sized gravel of flint.
River Terrace Deposits (Cohesive)	0.15-0.20 to 1.40-1.50m		Orange brown mottled pale grey sandy SILT/CLAY. Sand is fine.
River Terrace Deposits (Granular)	1.40-1.50 to >4.00m		Orange brown occasionally mottled light grey fine to medium SAND.

Please refer to the attached logs within appendix B for a full description.

No groundwater was recorded within the window sample boreholes completed for the winter groundwater monitoring standpipes at levels of ~1.40mbgl and noted to rise to between 1.20-1.30mbgl.

Soil infiltration testing was completed in general accordance with the testing standards identified in BRE 365: 2016 'Soakaway Design'. The test included the squaring of the pit sides before filling with potable water, the subsequent decline in water level was measured to allow determination of the coefficient of permeability (k); using this testing method, the rate of outflow between 75% and 25% effective depths are used to determine the soil infiltration rate.

Due to the slow rate of infiltration of SA1 and time limitations only one test cycle was completed, and further testing terminated on the client's instruction. As such only an estimated infiltration rate has been provided for this test.

The tables below summarise the test results.

Test ref	Test No	Test Depth (mbgl)	Initial fill level (mbgl)	Total Elapsed Time (minutes)	Time at 75% fill depth (mins)	Time at 25% fill Depth (mins)	Final Fill Level (mbgl)	k (m/s)
SA1	1	1.20	0.27	225	50	1275*	0.70	1.25×10^{-06}
	2	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-

*Estimated infiltration rate obtained from extrapolated data due to incomplete test.

Based upon the incomplete data results of the permeability testing completed the soils encountered on site were estimate to have coefficient of permeability (k) rates in the order of 1.25×10^{-06} m/s which equate to generally 'low end of good to poor' drainage rates drainage (Ref: Soil Mechanics in Engineering practice by Karl Terzaghi, Ralph B. Peck and Gholamreza Mesri; Table 14.1 Permeability and drainage characteristics of soils (after Casagrande and Fadum 1940)).

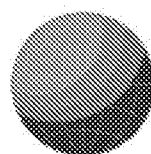
The full test results sheets can be found in Appendix B.

APPENDICES

Appendix A – Site Plan

Appendix B – Stratigraphic Logs

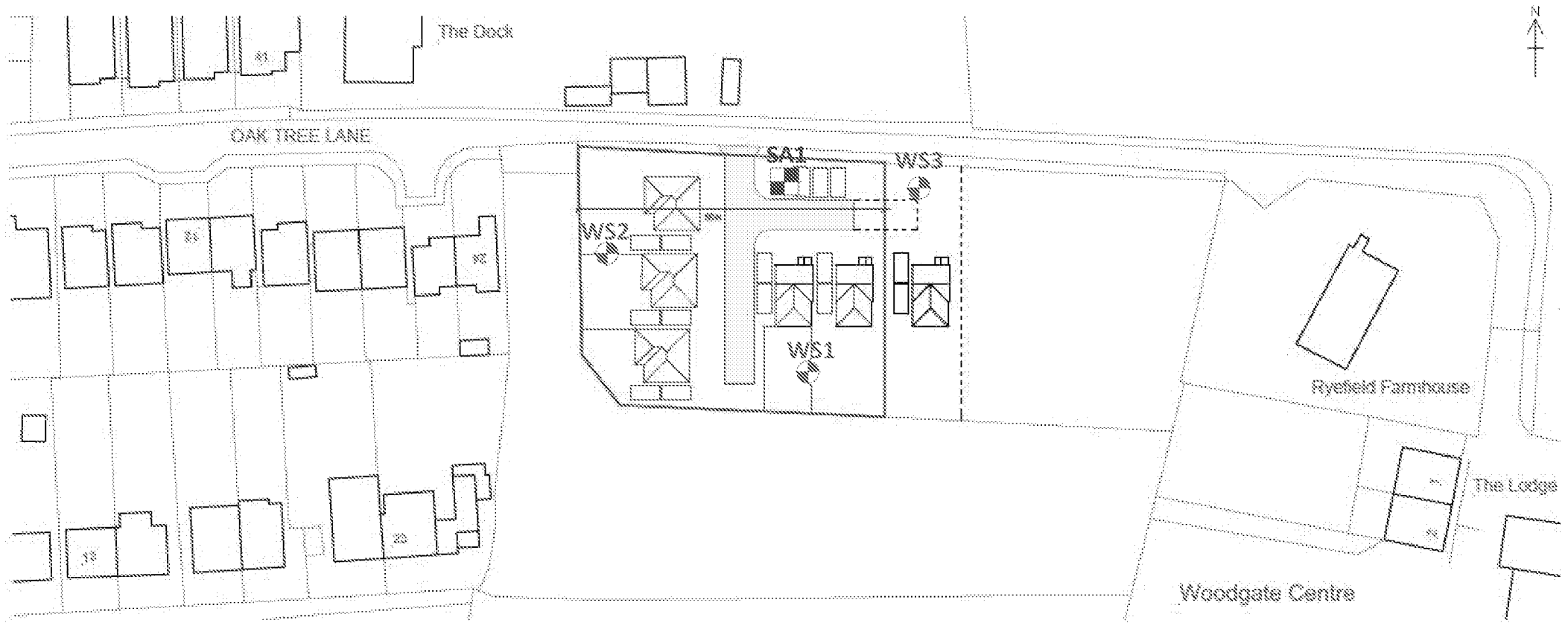
Appendix C – Photographs



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APPENDIX A

Site Plans



Notes:

1. Do not scale from this drawing.
2. All dimensions must be checked on site prior to commencement of work.
3. Where applicable this drawing is to be read in conjunction with other consultants drawings.
4. This drawing is the copyright of Impact Geotechnical Ltd.

Drawing Title:

Hole Location Plan

Site Name:

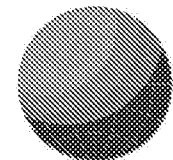
Land to the west of
Ryefield Farm House

Project Reference:

P21.109A

Revision: 0

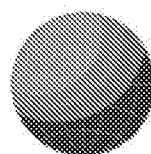
Drawn by: RM
Scale: Not to Scale



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APPENDIX B

Stratigraphic Logs & Insitu Test Results Sheets



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Land to the west of Ryefield Farm House



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Percussion Drilling Log

Project Name: Ryefield Farm House		Client: Domusea		Date: 26/01/2021	
Location: Eastergate, West Sussex		Contractor: Impact GEotechnical Ltd			
Project No. : P21.109B		Crew Name: SG		Drilling Equipment: Archway Dart	
Borehole Number WS1	Hole Type WLS	Level	Logged By RM	Scale 1:25	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					
					0.20			MADE GROUND: Grass over brown sandy Silt/Clay. Sand is fine. Rare subangular to subrounded fine to medium sized gravel of flint (TOPSOIL). Orange brown mottled pale grey sandy SILT/CLAY. Sand is fine (RIVER TERRACE DEPOSITS).	1
		1.00	SPT	N=14 (2,2/3,3,4,4)					
					1.50				
		2.00	SPT	N=17 (2,2/4,4,4,5)				Orange brown occasionally mottled light grey fine to medium SAND (RIVER TERRACE DEPOSITS).	2
					4.00			End of Borehole at 4.000m	4
									5

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

Groundwater encountered at 1.40mbgl and noted to rise to ~1.30mbgl. 35mm diameter groundwater standpipe installed at 4.00mbgl with 1.00m plain pipe and 3.00m slotted pipe.





Percussion Drilling Log

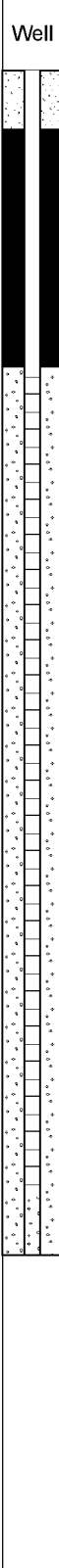
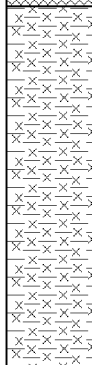
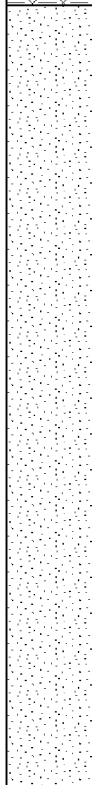
Project Name: Ryefield Farm House		Client: Domusea		Date: 26/01/2021	
Location: Eastergate, West Sussex		Contractor: Impact GEotechnical Ltd			
Project No. : P21.109B		Crew Name: SG		Drilling Equipment: Archway Dart	
Borehole Number WS2	Hole Type WLS	Level	Logged By RM	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15			MADE GROUND: Grass over brown sandy Silt/ Clay. Sand is fine. Rare subangular to subrounded fine to medium sized gravel of flint (TOPSOIL). Orange brown mottled pale grey sandy SILT/CLAY. Sand is fine (RIVER TERRACE DEPOSITS).	1
		1.00	SPT	N=14 (2,2/3,3,4,4)	1.40			Orange brown occasionally mottled light grey fine to medium SAND (RIVER TERRACE DEPOSITS).	2
		2.00	SPT	N=17 (2,2/4,4,4,5)					3
					4.00			End of Borehole at 4.000m	4
									5

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 Groundwater encountered at 1.40mbgl and noted to rise to ~1.20mbgl. 35mm diameter groundwater standpipe installed at 4.00mbgl with 1.00m plain pipe and 3.00m slotted pipe.										
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.20			MADE GROUND: Grass over brown sandy Silt/ Clay. Sand is fine. Rare subangular to subrounded fine to medium sized gravel of flint (TOPSOIL).	1	
								Orange brown mottled pale grey sandy SILT/CLAY. Sand is fine (RIVER TERRACE DEPOSITS).		
		1.00	SPT	N=14 (1,2/3,3,4,4)						
					1.40					
		2.00	SPT	N=17 (2,3/3,4,5,5)				Orange brown occasionally mottled light grey fine to medium SAND (RIVER TERRACE DEPOSITS).	2	
									3	

Remarks Groundwater encountered at 1.40mbgl and noted to rise to ~1.20mbgl. 35mm diameter groundwater standpipe installed at 3.80mbgl with 0.80m plain pipe and 3.00m slotted pipe.	
COUNCIL AL/81/21/PL	



Trial Pit Log

Project Name: Ryefield Farm House		Client: Domusea		Date: 26/01/2021	
Location: Eastergate, West Sussex		Contractor: Impact GEotechnical Ltd			
Project No. : P21.109B		Crew Name:		Equipment: Hand excavation equipment	
Location Number SA1	Location Type TP	Level	Logged By RM	Scale 1:25	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					
					0.20			MADE GROUND: Grass over brown sandy Silt/Clay. Sand is fine. Rare subangular to subrounded fine to medium sized gravel of flint (TOPSOIL).	
								Orange brown mottled pale grey sandy SILT/CLAY. Sand is fine (RIVER TERRACE DEPOSITS).	
					1.20			Below 1.00mbgl occasional to rare subangular to subrounded fine to medium gravel of flint.	1
								End of Borehole at 1.200m	2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.00	0.30	Good	None				

Remarks Hand dug trial pit dug to 1.20mbgl (0.30m x 1.00m) with soakaway testing completed.							
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BRE 365 Soil Infiltration Testing

Project Ref P21.109

Hole Ref

SA1

Site Name Ryefield Farmhouse

Test Number

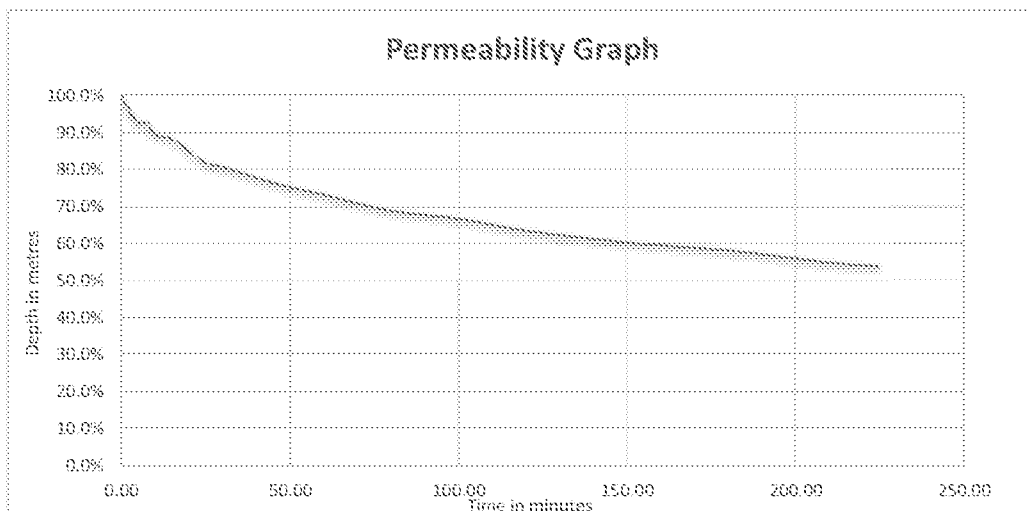
Test 1



Time in minutes	Depth to water surface (m)	Depth of water (m)	Percentage of water depth at start
0.00	0.270	0.93	100.0%
0.50	0.280	0.92	98.9%
1.00	0.290	0.91	97.8%
1.50	0.300	0.90	96.8%
2.00	0.300	0.90	96.8%
2.50	0.310	0.89	95.7%
3.00	0.320	0.88	94.6%
3.50	0.320	0.88	94.6%
4.00	0.330	0.87	93.5%
4.50	0.340	0.86	92.5%
5.00	0.340	0.86	92.5%
6.00	0.340	0.86	92.5%
7.00	0.340	0.86	92.5%
8.00	0.340	0.86	92.5%
9.00	0.360	0.84	90.3%
10.00	0.370	0.83	89.2%
15.00	0.380	0.82	88.2%
20.00	0.410	0.79	84.9%
25.00	0.440	0.76	81.7%
30.00	0.450	0.75	80.6%
45.00	0.490	0.71	76.3%
60.00	0.520	0.68	73.1%
80.00	0.560	0.64	68.8%
100.00	0.580	0.62	66.7%
120.00	0.610	0.59	63.4%
150.00	0.640	0.56	60.2%
180.00	0.660	0.54	58.1%
210.00	0.690	0.51	54.8%
225.00	0.700	0.50	53.8%
225.00	0.700	0.50	53.8%

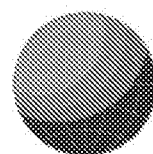
Pit Size		Time in mins	
Length	1.00	50	75%
Width	0.30	1275	25% (Estimated)
Depth	1.20		

Infiltration Rate from 75%-25% 1.25776E-06 (Estimated)



APPENDIX C

Photographs



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1.



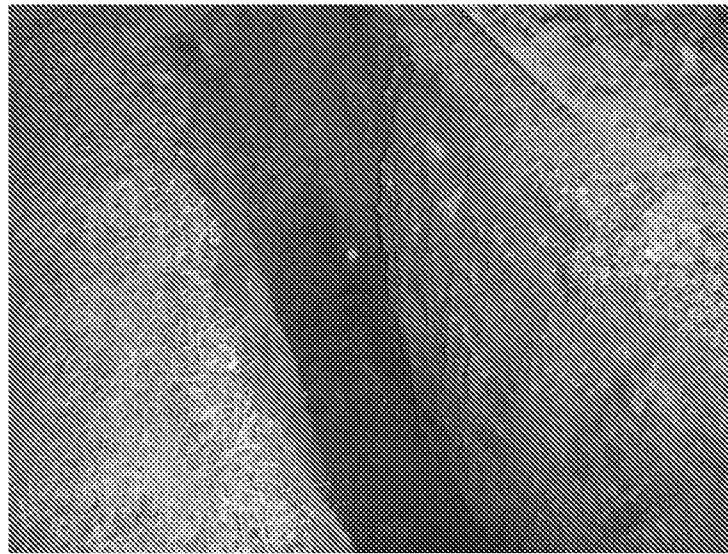
2.



3.



4.



Investigation Photographs

Project Ref: P21.109

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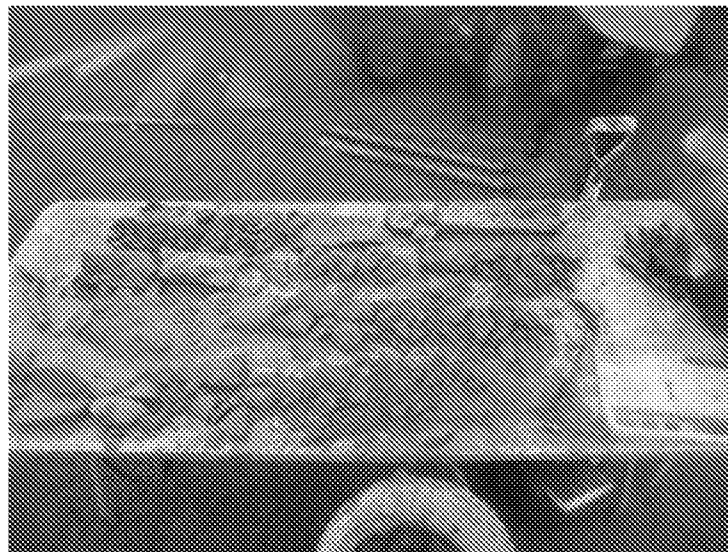
1. View of site
2. View of site
3. View of site
4. SA1



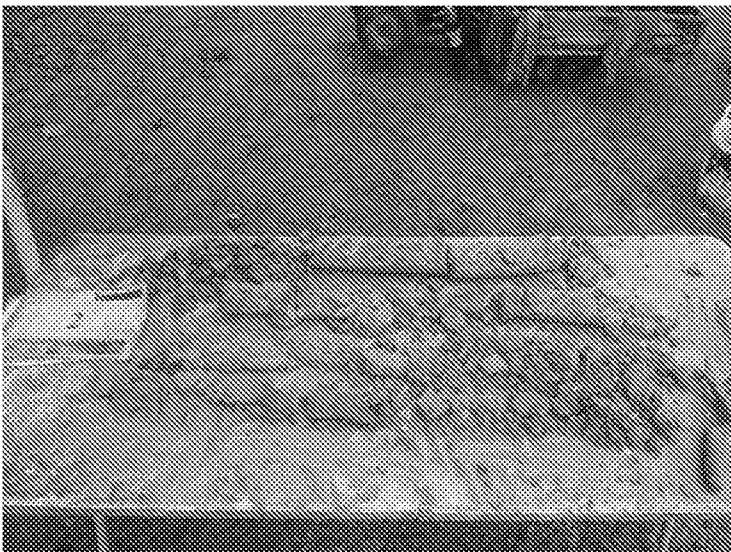
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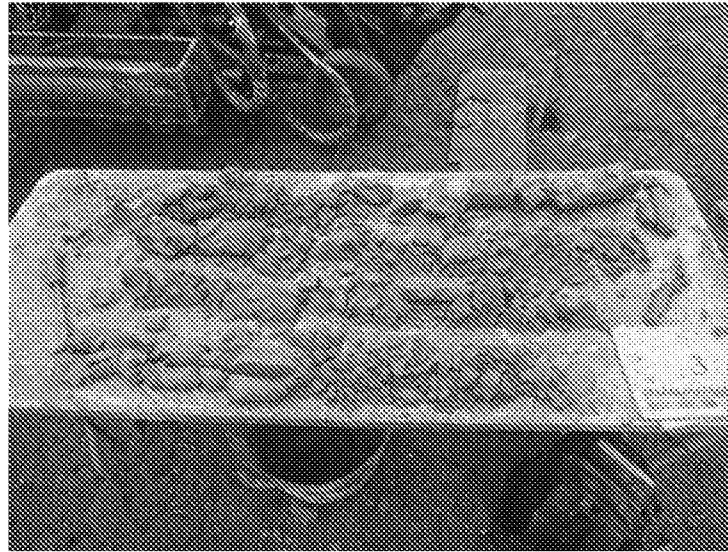
6.



7.



8.



Investigation Photographs

Project Ref: P21.109

Site Name: Land to the west of Ryefield Farmhouse

- 5. SA1 Spoil
- 6. WS1 1.00-4.00bgl
- 7. WS 1.00-4.001mbgl
- 8. WS3 1.00-4.00mbgl

