

GROUND INVESTIGATION REPORT
INCLUDING PERCOLATION TESTING

GROUND INVESTIGATION & PERCOLATION TESTING
LAND OFF HIGH ROAD, WESTON

PROJECT No: SW24-260
DOCUMENT REF: SW24-260-GI-01



FOR HIGHGROVE HOMES LTD.

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Revision	Date	Description		
-	Sept. 2024	First Issue	Prepared	Max Barlow
			Approved	A.Wilson CEng MStructE

1. Introduction

Acting upon the instruction of Highgrove Homes Ltd., we attended site on the 14th of August 2024, with the purpose being to observe the underlying ground conditions, determine the basic characteristics of the soil strata and comment on suitable foundations, as well as determine the infiltration potential of the soil.

Our comments are based upon a visual inspection of the disturbed samples obtained from our ground excavations and the in-situ strata within the trial pits and soakaways.

We would suggest the groundwater conditions may vary seasonally and that the water levels as recorded at the time of explorations should not necessarily be taken as being constant as they may be subject to fluctuations.

The opinions and comments expressed within this report are based upon ground conditions encountered in the trial pits excavated at the time of our visit.

This report has been prepared for the named client above and should not be relied upon by any other parties, with the exception of the client's professional advisors, for any use without the express written permission of Shields Wilson Limited.

2. Location & Description of Site

2.1. Site Location

The site is situated to the North of High Road, Weston, Spalding, Lincolnshire, with appropriate national grid reference TF285246.

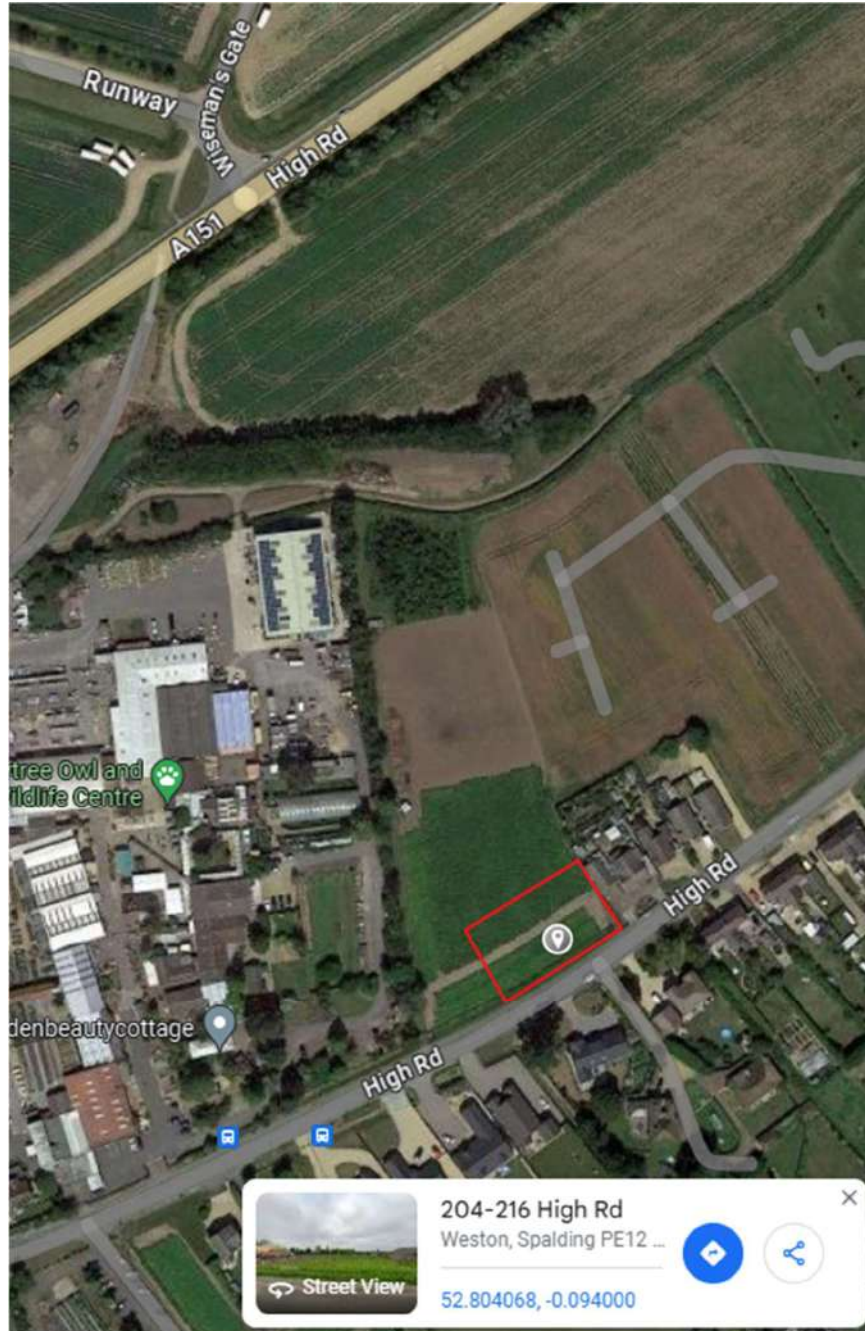


Figure 1: Site Location from Google Maps

2.2. Site Description

At the time of our visit the site consisted of an empty grass field.

The North of the site is bound by an agricultural field.

The East of the site is bound by an existing dwelling.

The South of the site is bound by High Road, being separated by an existing Riparian Dyke.

The West of the site is bound by a recently built existing dwelling, not being shown on google maps.

At the time of our visit the weather was dry and clear, however there had been some precipitation in the days leading up to our visit.

2.3. Geological Description

Desktop study of the area has been undertaken using the British Geological Society Maps.

The maps indicate the site to be underlain by superficial tidal flat deposits of Clay and Silt, with a bedrock geology of Mudstone, which is in line with what we would expect to see in this area.

This information is based upon publicly available records.

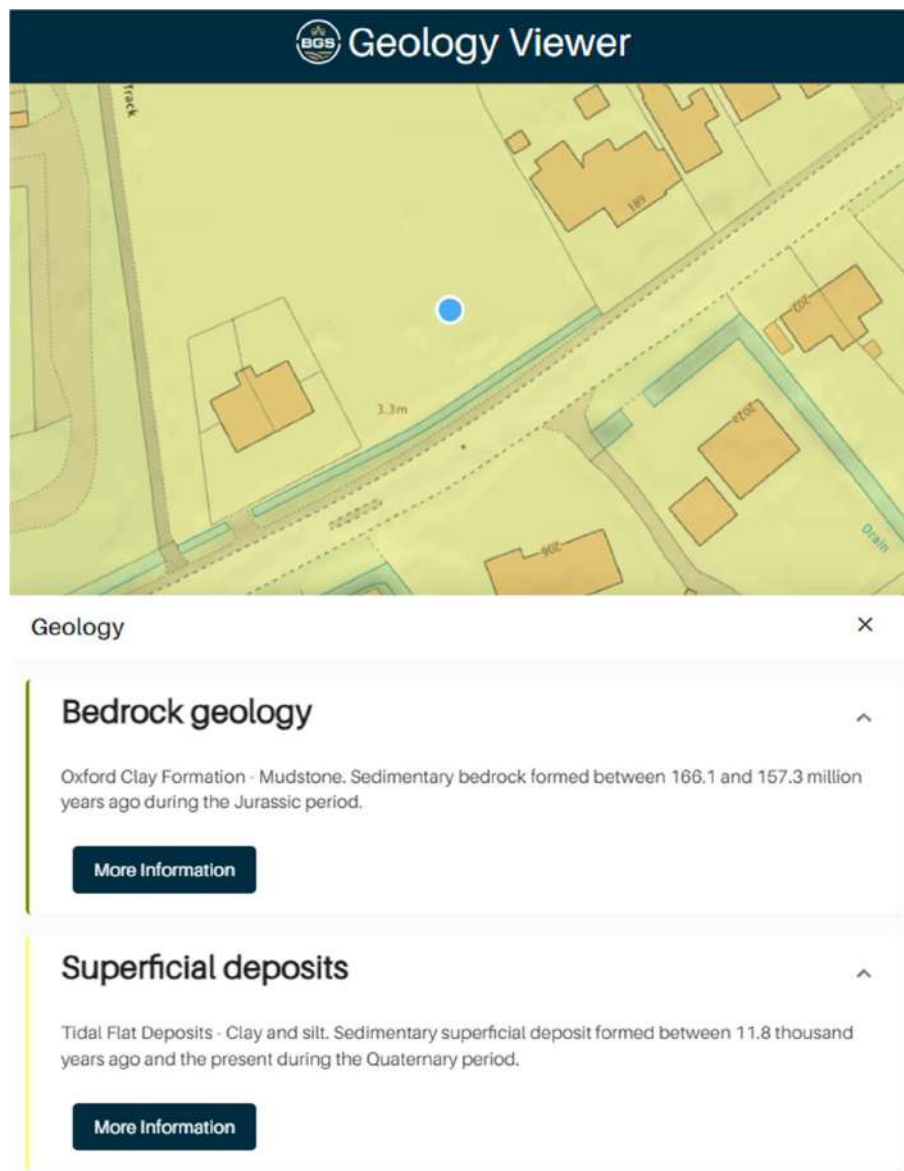


Figure 2: Data from BGS Geology Viewer

3. Site Works

2 No. Soakaways & 2 No. Trial Pits were excavated over the site with use of a mechanical excavator, local to the front and rear of each of the proposed dwellings.

A plan showing the locations of these excavations can be found in Appendix A.

Photographic records of the trial pits being dug can be found in Appendix B.

4. Ground Conditions

The strata encountered in all explorations were very similar and demonstrated a consistent geological profile to the desktop study. All Trial pits consisted of a 0.45m B.G.L. top layer of topsoil, followed by orangey brown silt till 1.8m B.G.L. in TP01 and 1.2m B.G.L. in TP02. From there the excavations became a soft light grey clay, becoming softer with depth until both pits were terminated, as deep as 3.7m B.G.L. in TP01.

No ground water was encountered in any of the Trial Pits/Soakaways.

A full description of the strata encountered above are shown on sheets SW24-260-SA01,SA02,TP01,TP02, contained within Appendix C.

5. Lab Results

During excavations in Trial pit TP01, a soil sample was collected to send off for both determination of liquid and plastic limits testing and determination of moisture content testing, performed by Ground Engineering Ltd. This soil sample was taken at 2.2m B.G.L.

Test results received from Ground Engineering limited showed the soil to be of high plasticity with a medium/high shrinkage potential, as well as having a moisture content of 51%.

Full extracts of the test results from Ground Engineering Limited can be found in Appendix D.

6. Percolation Tests

Two No. percolation tests were undertaken in SA01 & SA02 on the proposed site.

SA01 was undertaken towards the front of the site, while SA02 was undertaken towards the rear of the site.

Logs of the test and subsequent result calculations can be found within Appendix E. Appendix F contains a photographic record of these Soakaway tests.

7. Infiltration test results

Results from the infiltration testing are tabulated below:

Test Pit	Test 1	Test 2	Test 3
SA01 – Front	5.91×10^{-6}	4.78×10^{-6}	4.51×10^{-6}
SA02 – Rear	7.03×10^{-6}	4.84×10^{-6}	5.31×10^{-6}

The results are average for infiltration in the area and demonstrate that the underlying geology of the site is suitable for infiltration.

8. Conclusions & Recommendations

The strata encountered in all excavations were very similar across the board and demonstrated a consistent geological profile across the site, with a top layer of topsoil, followed by orangey brown silt, becoming a soft grey clay with depth. No ground water was encountered in any of the excavations.

Soil testing was performed by Ground Engineering Limited and showed the soil to be high plasticity and have a mid/high shrinkage potential, as well as a moisture content of 51%.

The proposed development consists of 2 no. bungalows, with attached garages.

The dwellings will be of traditional masonry cavity construction, with timber prefabricated roof trusses to form the shells. The ground floor will be made up of beam and block flooring.

Dwellings with structures of this nature are likely to develop foundation loads in the region of 35kN/m.

The results of the ground investigation provide sufficient information that traditional strip foundations will be suitable for this development. However, we would recommend introducing a layer of A393 mesh into the foundation in order to limit the influence of any potential soft spots that may be encountered during groundworks.

Safe bearing pressures should be limited to 65kN/m². This would provide more than sufficient safe working loads and limit any potential differential settlement.

Foundations should be founded at a minimum of 900mm below existing ground level onto the light brown dry silt that was encountered during the ground investigation. Prior to construction detailed foundation designs should be undertaken by a competent structural engineers.

The potential shrinkage should be considered in relation to any local tree influence by a suitably qualified engineering during foundation design. The medium/high shrinkage potential of the underlying clay may lead to a necessary deepening at footings in accordance with chapter 4.2. guidance in relation to any trees local the proposed footings.

The ground conditions encountered on site, and percolation test results indicate that the site is suitable for the use of infiltration drainage techniques for disposal of run-off water.

The calculated infiltration rates are average for this area, and display that garden soakaways are likely to be effective for the proposed dwellings.

Designs of infiltration features and soakaways should be based upon the worst case calculated infiltration rate of 4.51×10^{-6} .

For and on behalf of **SHIELDS WILSON LIMITED**

M. Barlow

(Checked) A.P.Wilson CEng MStructE

17th September 2024

Appendix A



PLEASE REFER TO ARCHITECTS DRAWINGS FOR
CONFIRMATION OF ALL WALL/SETTING OUT
DIMENSIONS PRIOR TO COMMENCING OF WORKS

THIS DRAWING MUST BE READ IN CONJUNCTION
WITH ALL RELEVANT DRAWINGS & STRUCTURAL
CALCULATIONS

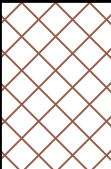
-	PRELIMINARY - FOR APPROVAL	MRB	APW	17.09.24
REV.	DESCRIPTION	DRN.	APP.	DATE
SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				
STATUS		FOR INFORMATION		
CLIENT		HIGHGROVE HOMES LTD.		
PROJECT		GROUND INVESTIGATION RESIDENTIAL DEVELOPMENT, LAND OFF HIGH ROAD, WESTON, SPALDING, PE12 6JU		
TITLE		PROPOSED SKETCH SHOWING SOAKAWAY & TRIAL PIT LOCATIONS		
DATE	SEP. '24	SCALE	DRAWING NO.	
DRAWN	MRB	1:250	SW24-260-SK001	
				REV.
				-

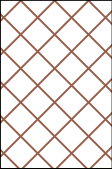
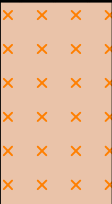
Appendix B





Appendix C

SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				LOGGED BY	JL	JOB NO.	SW24-260	SA01
				DRAWN BY	MRB	DATE OF TESTING	14/08/24	
PROJECT GROUND INVESTIGATION RESIDENTIAL DEVELOPMENT, LAND OFF HIGH ROAD, WESTON, SPALDING, P12 6JU				SITE COORDINATES TF285246				
				GROUND LEVEL APPROX. 3.250				
CLIENT HIGHGROVE HOMES LTD.				EXCAVATION METHOD MECHANICAL EXCAVATOR				
DESCRIPTION		REDUCED LEVEL	LEGEND	(THICK) DEPTH	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE
TOPSOIL				(0.45m) 0.45m				
ORANGEY BROWN SILT				(0.55m) 1.0m				
REMARKS: TRIAL PIT TERMINATED @ 1.0m B.G.L.								

SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				LOGGED BY	JL	JOB NO.	SW24-260	SA02
				DRAWN BY	MRB	DATE OF TESTING	14/08/24	
PROJECT GROUND INVESTIGATION RESIDENTIAL DEVELOPMENT, LAND OFF HIGH ROAD, WESTON, SPALDING, P12 6JU				SITE COORDINATES TF285246				
				GROUND LEVEL APPROX. 3.050				
CLIENT HIGHGROVE HOMES LTD.				EXCAVATION METHOD MECHANICAL EXCAVATOR				
DESCRIPTION		REDUCED LEVEL	LEGEND	(THICK) DEPTH	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE
TOPSOIL				(0.45m) 0.45m				
ORANGEY BROWN SILT				(0.55m) 1.0m				
REMARKS: TRIAL PIT TERMINATED @ 1.0m B.G.L.								

PROJECT GROUND INVESTIGATION
RESIDENTIAL DEVELOPMENT, LAND OFF HIGH ROAD,
WESTON, SPALDING, P12 6JU

SITE COORDINATES
TF285246

GROUND LEVEL
APPROX. 3.000

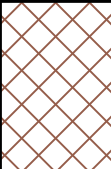
CLIENT HIGHGROVE HOMES LTD.

EXCAVATION METHOD
MECHANICAL EXCAVATOR

DESCRIPTION	REDUCED LEVEL	LEGEND	(THICK) DEPTH	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE
TOPSOIL			(0.45m) 0.45m				
ORANGEY BROWN SILT			(1.35m) 1.8m			0.9m 84 BLOWS FOR 0.3m MOVEMENT 1.2m 54 BLOWS FOR 0.3m MOVEMENT	
LIGHT GREY CLAY, SOFT, BECOMING SOFTER WITH DEPTH			(1.9m) 2.2m 3.7m	SAMP-01	AL ¹ & MC ²	2.2m	19mm SV: 25kPa, 35kPa, 45kPa, 35kPa

- 1) AL = ATTERBERG LIMITS
2) MC = MOISTURE CONTENT

REMARKS: SAMPLE TAKEN @ 2.2m B.G.L.
TRIAL PIT TERMINATED @ 3.7m B.G.L.

SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				LOGGED BY	JL	JOB NO.	SW24-260	TP02
				DRAWN BY	MRB	DATE OF TESTING	14/08/24	
PROJECT GROUND INVESTIGATION RESIDENTIAL DEVELOPMENT, LAND OFF HIGH ROAD, WESTON, SPALDING, P12 6JU				SITE COORDINATES TF285246				
				GROUND LEVEL APPROX. 3.000				
CLIENT HIGHGROVE HOMES LTD.				EXCAVATION METHOD MECHANICAL EXCAVATOR				
DESCRIPTION	REDUCED LEVEL	LEGEND	(THICK) DEPTH	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE	
TOPSOIL			(0.45m) 0.45m			1.2m 16 BLOWS FOR 0.3m MOVEMENT 1.5m 22 BLOWS FOR 0.3m MOVEMENT		
ORANGEY BROWN SILT			(0.75m) 1.2m					
LIGHT GREY CLAY, SOFT, BECOMING SOFTER WITH DEPTH			(1.8m) 3.0m					
REMARKS: TRIAL PIT TERMINATED @ 3.0m B.G.L.								

Appendix D



8180

**Ground Engineering Ltd**

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

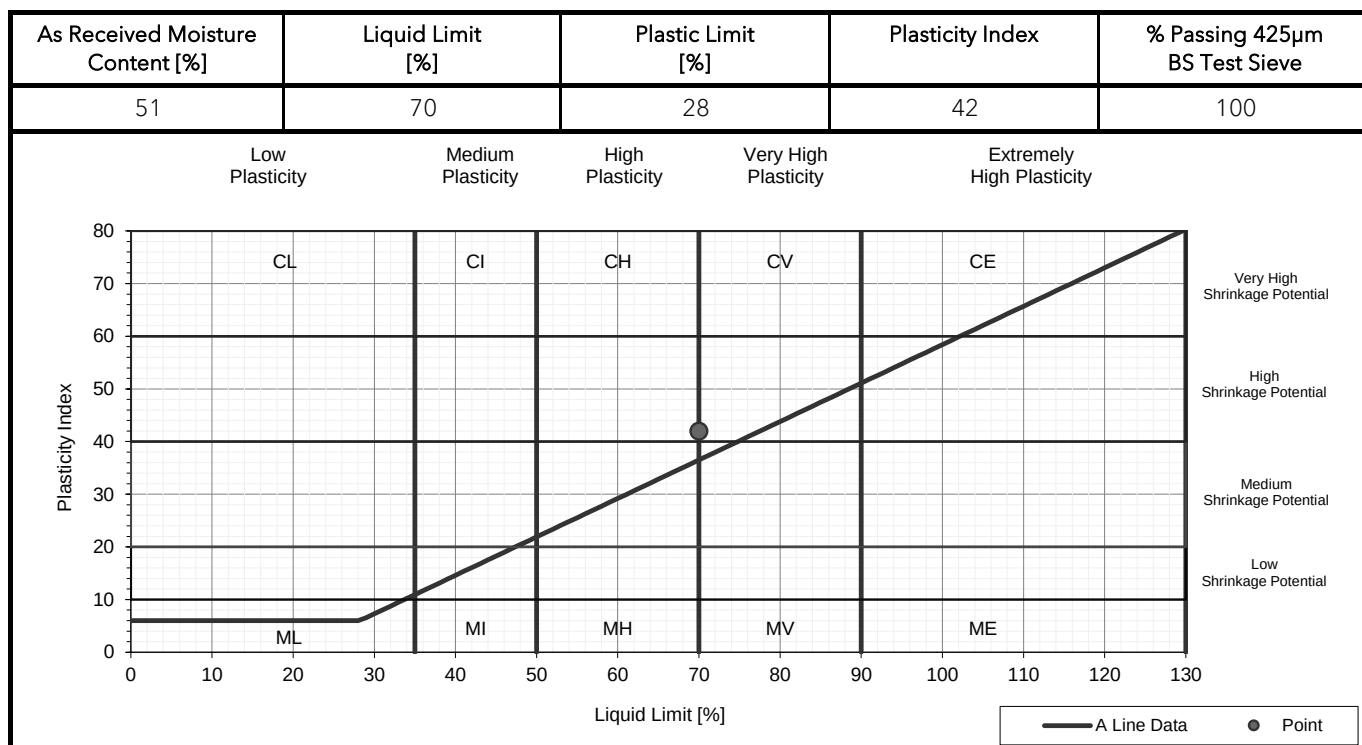
Tested in Accordance with BS1377-2: 1990: Clause 4.4 & 5: One Point Method

Newark Road, Peterborough
t: 01733 566566
e: geadmin@luciongroup.com

Client: Shields Wilson Ltd
Client Address: 21 High Street
Kirton
Lincolnshire
PE20 1DR
Contact: Adam Wilson
Site Name: High Road, Weston

Certificate Number: PL8727-1/1/704
Client Reference: 120027
Job Number: PL8727-1
Date Sampled: 14/08/2024
Date Received: 16/08/2024
Date Tested: 21/08/2024
Certificate of Sampling: N/A
Sampling Certificate No.: N/A
Sampled By: Client

TEST RESULTS

Laboratory Reference: PL8727-1/1**Sample Reference:** S01**Sample Description:** Soft brown grey-brown black slightly organic CLAY.**Location:** TP03**Depth:** 2.20m**Sample Preparation:** Tested in natural condition

Comments:

Approved Signatory: Matt Hartnup - Laboratory Manager

Signed:

Date Reported: 29/08/2024
Form Number: GELab/C/704 Issue 2 Version 1

for and on behalf of Lucion Ground Engineering Ltd

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Registered in England and Wales
Registration Number: 6929574
Reg Office: Lucion Ground Engineering Ltd
Newark Road, Peterborough PE1 5UA



8180

**Ground Engineering Ltd**

TEST CERTIFICATE

Determination of Moisture Content

BS 1377 : Part 2 : 1990, clause 3.2

Newark Road, Peterborough
t: 01733 566566
e: geadmin@luciongroup.com

Client: Shields Wilson Ltd
Client Address: 21 High Street
Kirton
Lincolnshire
PE20 1DR
Contact: Adam Wilson
Site Name: High Road, Weston

Certificate No: PL8727-1/1/705
Client Reference: 120027
Job Number: PL8727-1
Date Sampled: 14/08/2024
Date Received: 16/08/2024
Date Tested: 21/08/2024
Certificate of Sampling: N/A
Sampling Certificate No.: N/A
Sampled By: Client

TEST RESULTS

Laboratory Reference	Sample Reference	Location	Depth Top (m)	Depth Base (m)	Description	Moisture Content [%]
PL8727-1/1	S01	TP03	2.20		Soft brown grey-brown black slightly organic CLAY.	51

Comments:

Approved Signatory: Matt Hartnup - Laboratory Manager

Signed:

for and on behalf of Lucion Ground Engineering Ltd

Date Reported: 29/08/2024
Form Number: GELab/C/705 Iss 2 rev 1

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Registered in England & Wales
Registration Number: 6929574
Reg Office: Lucion Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

Appendix E

PROPOSED 2 PLOT DEVELOPMENT, WESTON

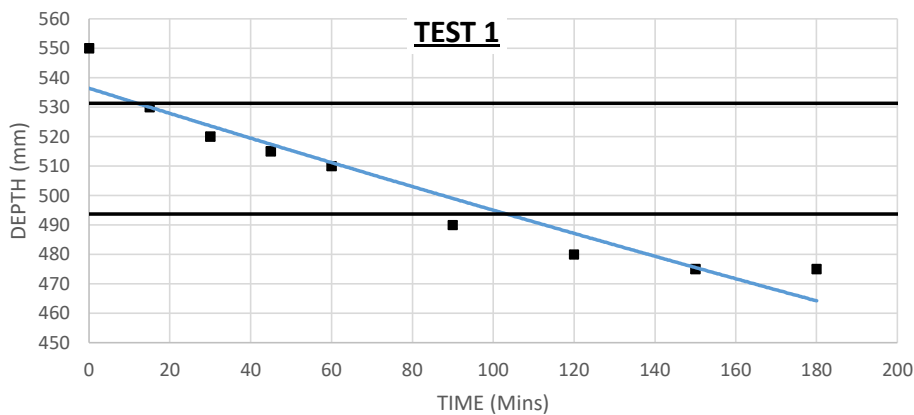
TP01	TEST 1	TEST 2	TEST 3
TIME (Mins)	DEPTH mm (d)	DEPTH mm (d)	DEPTH mm (d)
0	550	565	580
15	530	560	570
30	520	550	565
45	515	550	560
60	510	540	550
90	490	530	545
120	480	520	535
150	475	510	525
180	475	510	525

INFILTRATION TEST - HOLE TP01

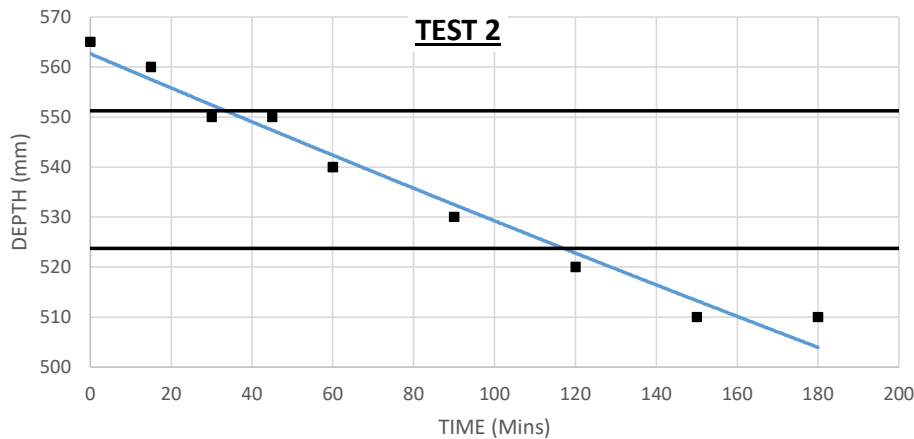
PROJECT NO. 24-260

SITE VISIT: 14/08/2024

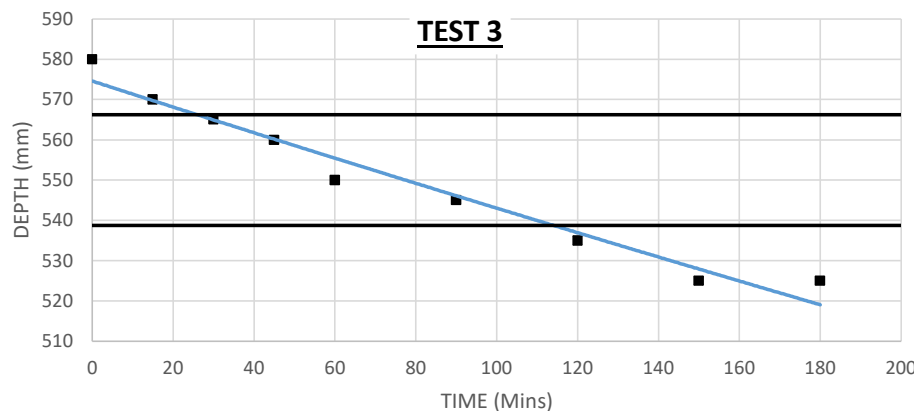
TRIAL PIT DIMENSIONS (m)	
A [L]	1.50
B [W]	0.60
C [D]	1.00



SOIL INFILTRATION RATE, f
TEST 1
5.91017E-06 m/s
0.021276596 m/h



SOIL INFILTRATION RATE, f
TEST 2
4.77887E-06 m/s
0.017203927 m/h



SOIL INFILTRATION RATE, f
TEST 3
4.51338E-06 m/s
0.016248154 m/h

PROPOSED 2 PLOT DEVELOPMENT, WESTON

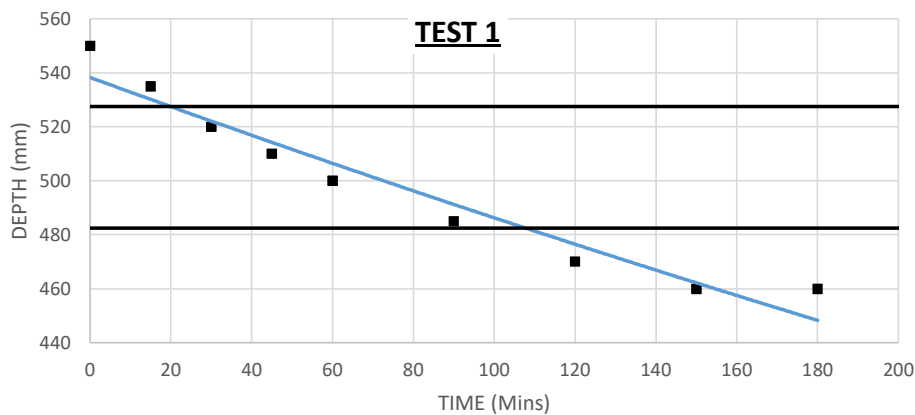
TP02	TEST 1	TEST 2	TEST 3
TIME (Mins)	DEPTH mm (d)	DEPTH mm (d)	DEPTH mm (d)
0	550	570	575
15	535	565	565
30	520	560	560
45	510	555	550
60	500	550	540
90	485	540	530
120	470	530	520
150	460	515	510
180	460	515	510

INFILTRATION TEST - HOLE TP02

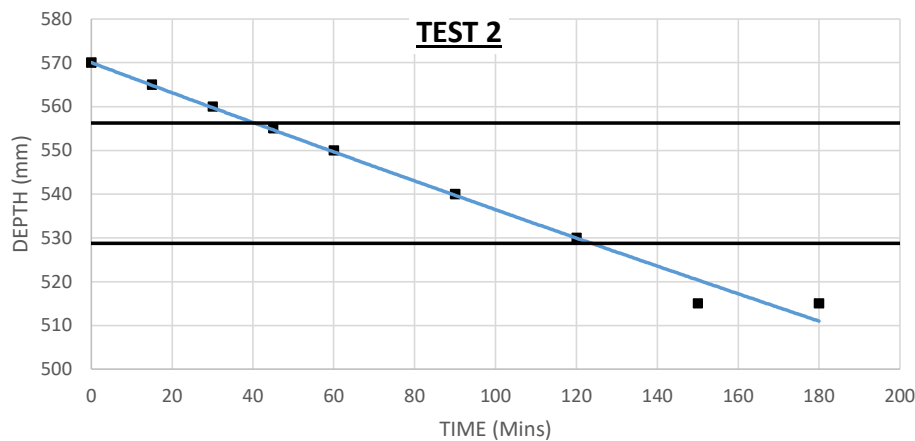
PROJECT NO. 24-260

SITE VISIT: 14/08/2024

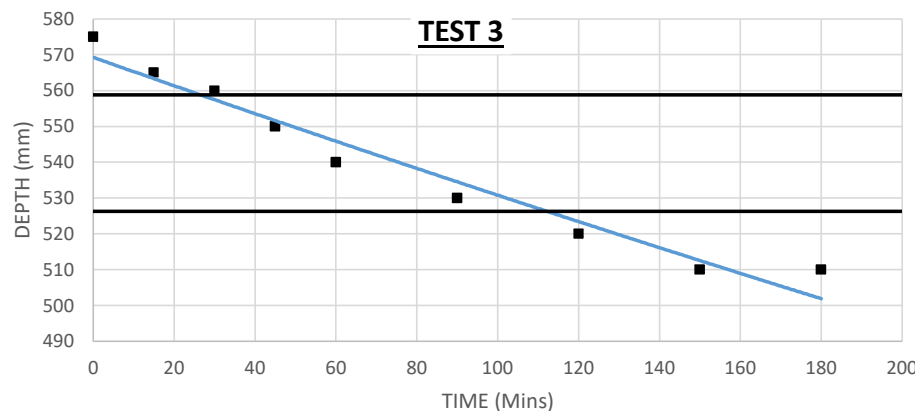
TRIAL PIT DIMENSIONS (m)	
A [L]	1.60
B [W]	0.70
C [D]	1.00



SOIL INFILTRATION RATE, f
TEST 1
7.03341E-06 m/s
0.025320271 m/h



SOIL INFILTRATION RATE, f
TEST 2
4.84494E-06 m/s
0.017441778 m/h



SOIL INFILTRATION RATE, f
TEST 3
5.30976E-06 m/s
0.019115137 m/h

Appendix F

