

A1816-2
Geo-Environmental Report

**Land Adj to Chestnut Terrace,
Sutton Bridge, Lincolnshire.**



For

Lincoln Jack Ltd

October 2018
Report Number: A1816-2

AGS Ground Solutions Ltd, 4 Bond Street, Redruth,
Cornwall TR15 2QB

DOCUMENT CONTROL

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CONTENTS

	Page
1. INTRODUCTION	1
2. SITE LOCATION AND LAYOUT	2
3. ENVIRONMENTAL SETTING	3
3.1 GEOLOGY	3
4. INTRUSIVE INVESTIGATION	4
4.1 FIELDWORK	4
4.2 GROUNDWATER	5
5. LABORATORY TESTING	7
5.1 GEOTECHNICAL TESTING	7
5.2 ANALYTICAL TESTING	7

FIGURES:

1. Site Location Plan
2. Exploratory Hole Location Plan
3. Pocket Penetrometer vs Depth Plot
4. Combined Dynamic Probe Sounding Plot

APPENDICES:

1. Site Photographs
2. Window Sample Hole Logs
3. Dynamic Probe Soundings
4. Trial Pit Logs
5. Percolation Test Results
6. Geotechnical Laboratory Test Results
7. Analytical Laboratory Test Results

1. INTRODUCTION

AGS Ground Solutions (AGS) was commissioned by Alan Brown Development Services Ltd (The Planning Consultant) on behalf of Lincoln Jack Ltd (The Client) to undertake a geo-environmental site investigation on a site known as Land Adj to Chestnut Terrace, Sutton Bridge.

It is understood that the development will comprise the erection of 18 no. detached residential dwellings, on disused farmland.

The purpose of the ground investigation was to carry out a due diligence study on the entire site, prior to purchase, and also to determine the near-surface ground profile and to provide information for the design of foundations for new structure on the areas of the site where houses are planned. In addition, the risks posed by ground contamination were also examined.

For the purposes of this investigation, the site was divided into three areas; Area A, a square plot at the northern end of Withington Street, where 9 detached houses are planned; Area B, an L-shaped plot to the north and east of Chestnut Terrace, where 9 detached houses are planned; Area C, a rectangular plot to the north of plots A and B, where no development is currently planned.

A Phase 1 Geo-Environmental Report was published by AGS Ground Solutions on 24th September 2018 – Report number A1816-1. This report should be read in conjunction with the Phase 1 Report.

Our general Terms and Conditions are applicable to this report.

2. SITE LOCATION AND LAYOUT

A site walkover survey was presented in the Phase 1 Report.

No changes were noted on the site between the site walkover survey and the intrusive site investigation.

3. ENVIRONMENTAL SETTING

3.1 GEOLOGY

Reference to the British Geological Survey 1:50,000 scale geological map of the area shows the site as being underlain by Superficial deposits, identified as Tidal Flat Deposits – Clay and Silt (TFD). This is shown to be underlain by The Ampthill Clay Formation - Mudstone (AMC).

The British Geological survey provides the following geological descriptions. Contains British Geological Survey materials © NERC 2018:

Tidal Flat Deposits – Clay and Silt (TFD)

Description: Tidal Flat Deposits - Clay And Silt. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by shorelines (U).

Setting: shorelines (U). These sedimentary deposits are shallow-marine in origin. They are detrital, generally coarse-grained forming beaches and bars in a coastal setting.

Ampthill Clay Formation – Mudstone (AMC)

Description: Ampthill Clay Formation - Mudstone. Sedimentary Bedrock formed approximately 157 to 164 million years ago in the Jurassic Period. Local environment previously dominated by shallow seas.

Setting: shallow seas. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

4. INTRUSIVE INVESTIGATION

4.1 FIELDWORK

The site works were carried out between the 26th September and 27th September 2016 and comprised the following:

- Excavation of 8 no. Window Sample Holes to depths of 5.45 m.
- Performance of 2 no. Dynamic Probe Soundings to depths of between 15.80 m and 15.90 m.
- Excavation of 8 no. Trial Pits to depths of between 1.50 m and 3.00 m.
- Percolation tests within 2 no. of the Trial Pits.

The positions of the above works on the site are indicated on Figure 2, Exploratory Hole Location Plan.

The intrusive investigation was concentrated in areas A and B, where buildings were planned, with only limited investigation in Area C.

Window Sample Holes

Eight Window Sample Holes were excavated on the site between the 26th and 27th September 2018.

Window sample holes WS1 to WS8 were excavated on the site using an Archway Competitor Dart window sample rig.

The window sample holes were excavated to examine the ground, and to establish the thickness of each of the soil horizons. The resulting cores were examined by an engineer.

Standard Penetration Tests (SPTs) were performed every 1.0 m intervals in all of the window sample holes.

A hand-held pocket penetrometer was used to gather information on mass shear strength within the window sample arisings.

Samples were recovered for laboratory analysis.

Pocket Penetrometer results are shown on Figure 3.

Window Sample Hole Logs are presented in Appendix 2.

Dynamic Probe Soundings

Two Dynamic Probe Soundings were completed on the site on 27th September 2018.

Dynamic Probe Soundings DP1 to DP2 were performed using an Archway Competitor Dart Window Sample Rig.

The test comprised recording the number of blows to drive a steel cone in increments of 100 mm into the ground. This was recorded as the DPN100 value.

The purpose of the dynamic probe soundings was to establish the likely depth to the Ampthill Clay Formation on the site.

A combined dynamic probe plot is presented in Figure 4.

The dynamic probe results are presented in Appendix 3.

Trial Pits

Eight trial pits were excavated using a backhoe excavator on the 27th September 2018.

Trial pits TP1 to TP8 were excavated to supplement the data gathered from the windowless sampling, to allow an in-situ observation of the soils on the site to be made and to enable percolation testing to be carried out.

Percolation testing was carried out in trial pits TP1 and TP2. It was planned to carry out the percolation tests in accordance with BRE special digest 365, with three flings in each pit. However, owing to a very slow percolation rate, this was not possible.

It was also planned to carry out percolation testing in at least one other location, however, access onto the site for the water tanker did not permit this.

Photographs of trial pits are presented in Appendix 1.

Trial Pit logs are presented in Appendix 4.

Percolation test results are presented in Appendix 5.

4.2 GROUNDWATER

Groundwater was encountered across the site. Details are presented in the table below.

Location	Depth Struck	Rising To	After	Note
	(m BGL)	(m)	(mins)	
WS1	2.40	2.40	20	During excavation
WS2	2.45	2.45	20	During excavation
WS3	2.30	2.30	20	During excavation
	-	2.73	-	End of day
WS4	2.40	2.40	20	During excavation

	-	2.58	-	End of day
WS5	2.40	2.40	20	During excavation
WS6	2.80	2.80	20	During excavation
	-	2.45	-	End of day
WS7	2.80	2.80	20	During excavation
WS8	2.60	2.60	20	During excavation
	-	1.47	-	Immediately after installation (end of day)
TP1	DRY	DRY	20	Percolation test
TP2	DRY	DRY	20	Percolation test
TP3	2.30	2.30	20	Soils noted as saturated
TP4	2.50	2.50	20	Soils noted as saturated
TP5	DRY	DRY	20	
TP6	DRY	DRY	20	
TP7	DRY	DRY	20	
TP8	DRY	DRY	20	

It should be noted that the absence of groundwater is not necessarily indicative of the absence of a groundwater table in view of the short period the trial excavations remained open. Groundwater levels may vary due to seasonal fluctuations in rainfall, but in the shorter term can be affected by antecedent weather conditions or other causes.

5. LABORATORY TESTING

5.1 GEOTECHNICAL TESTING

The following range of laboratory tests was scheduled:

Moisture Content of soil	16 no.
Liquid and Plastic Limits of soil	8 no.
Particle Size Distribution (Wet Sieve)	8 no.
Bulk & Dry Density	3 no.
Oedometer Consolidation	3 no.
Quick Undrained Triaxial Compression	7 no.

The results of geotechnical testing are presented in Appendix 5.

5.2 ANALYTICAL TESTING

Chemical analysis of the samples was undertaken by i2 Analytical, Watford (UKAS & MCERTS accredited). A selection of soil samples were analysed for contaminants considered appropriate to the history of the site:

Toxic Metals	Phytotoxic Metals	Inorganic Compounds	Organic Compounds
Arsenic Cadmium Chromium Copper Lead Mercury Nickel Selenium Zinc	Copper Nickel Zinc	Sulphate (water soluble) pH value	Total Petroleum Hydrocarbons (TPH) Polycyclic Aromatic Hydrocarbons (PAH) Soil Organic Matter Mineral Oil

The results of the analytical testing are presented in Appendix 6.

FIGURES:

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Figure 1
Site Location Plan



Project Sutton Bridge

Project Number A1816

Location Spalding, Lincolnshire

Client Lincoln Jack Ltd / Alan Brown Development Services Ltd

Drawing Title Site Location Plan

Drawing Number	Revision	Date	Approximate Scale
A1816-01	1	03/10/2018	1:10000 @ A4

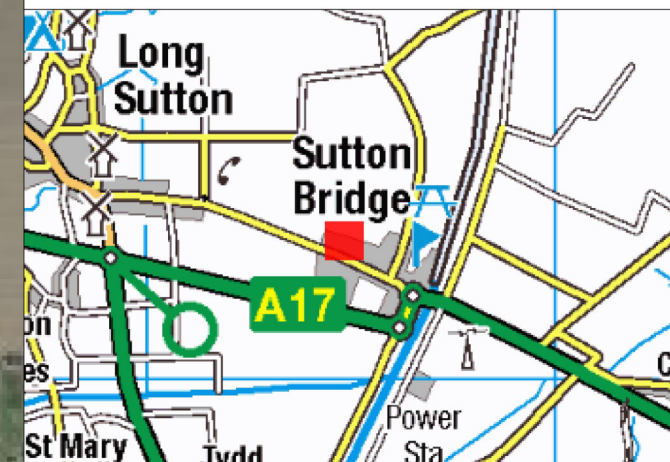
Key

 Site Boundary

0 100 200 300 400 500 m



Figure 2
Exploratory Hole Location Plan



Project			Sutton Bridge
Project Number			A1816
Location			Spalding, Lincolnshire
Client			Lincoln Jack Ltd / Alan Brown Development
Drawing Title			Exploratory Hole Location Plan
Drawing Number	Revision	Date	Approximate Scale
A1816-02	1	03/10/2018	1:2500 @ A4

Key

- Site Boundary
- Approximate Borehole Locations
- Approximate Trial Pit Locations

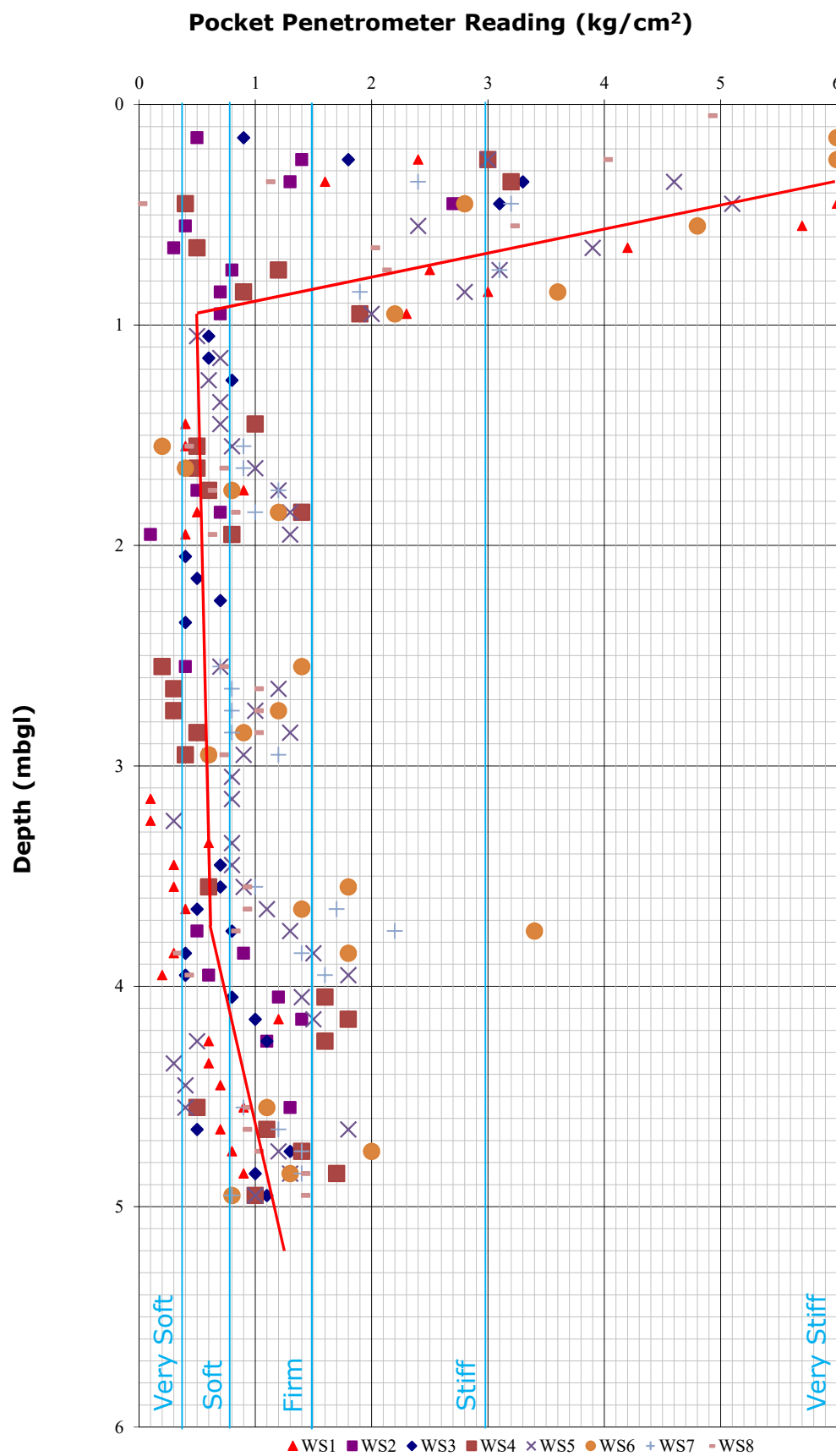
0 20 40 60 80 100 m



Figure 3

Pocket Penetrometer vs. Depth Plot

Figure 3. Pocket Penetrometer Reading-Depth Profile



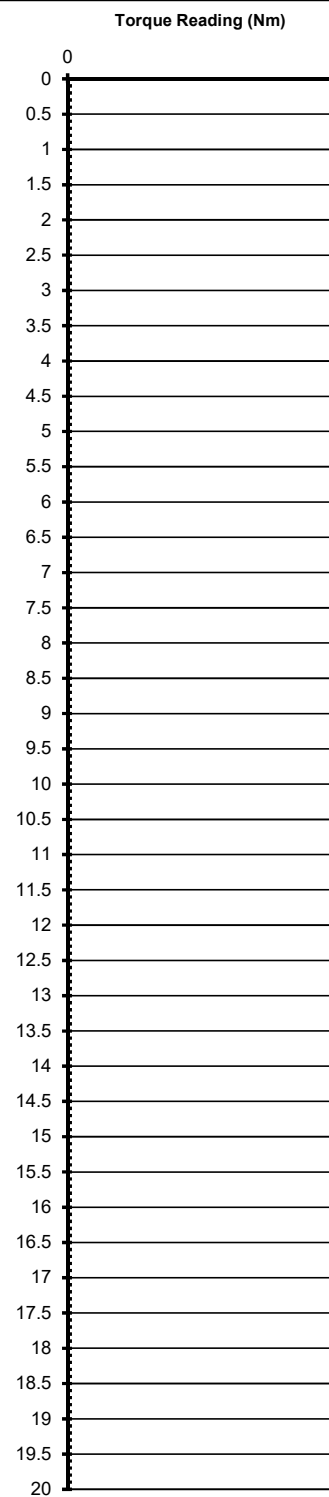
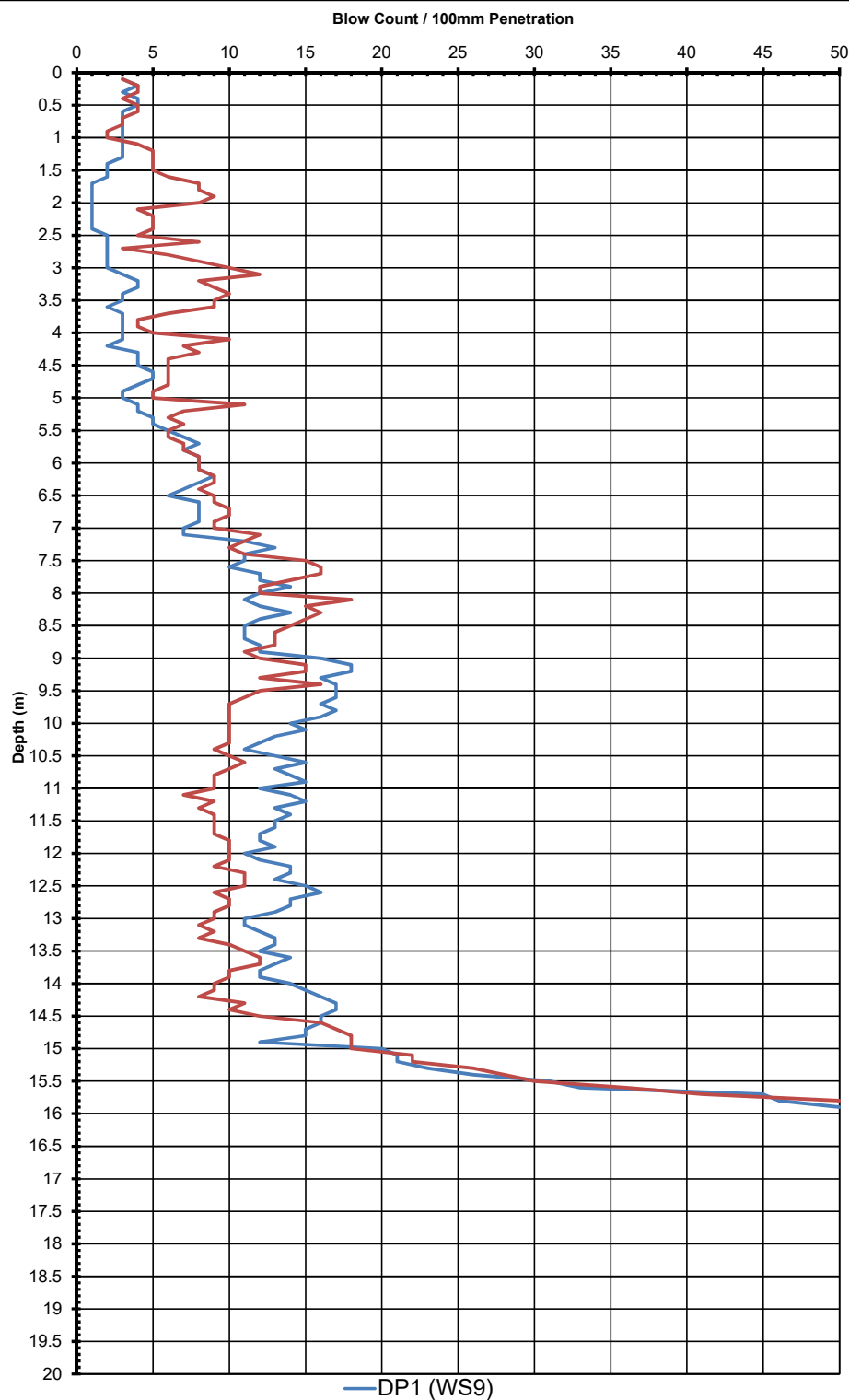
Compiled:
CS

Checked:
PF

Approved:
PF

Figure 4
Combined Dynamic Probe Plot

DYNAMIC PROBE TEST RESULTS						Probe No:	Combined
Project Name:	Sutton Bridge					Lab. Order No:	n/a
Client Name:	Lincoln Jack Ltd / Alan Brown Development Services Ltd					Project No:	A1816
Hammer Weight:	63.5 kg	Cone Diameter:	43.7 mm			Date:	03/10/2018
Hammer Drop:	500 mm	Rod Diameter:	35 mm			Ground Level (m)	-



AGS Ground Solutions www.app-geo.co.uk		
Tested By: C-JD	Approved By: PF	
Checked By: IP		

Appendix 1

Site Photographs



Photograph 1: General view of site, facing west, showing the northern end of Area A, and the western end of Area C. The drill rig is set up on window sample hole WS1.



Photograph 2: Location of window sample hole WS5, facing north west. The white van is parked at the western end of Area C. The drill rig is positioned within Area B.



Photograph 3: View from Area B, looking east, showing the eastern end of Area C. The vehicles parked denote the end of Area C.



Photograph 4: Trial pit TP1 immediately prior to filling.



Photograph 5: Trial pit TP2, immediately prior to filling.



Photograph 6: Trial pit TP3, showing collapsing of saturated soil.



Photograph 7: Trial Pit TP4, showing the collapsing of trial pit sides due to saturated soil.



Photograph 8: Trial Pit TP5.



Photograph 9: Trial Pit TP6.



Photograph 10: Trial pit TP7



Photograph 11: Trial pit TP8

Appendix 2

Window Sample Hole Logs

Project Name: Sutton Bridge
Project Location: Spalding, Lincolnshire
Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd

Job No:
A1816

Ground Level (m):

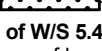
Date Started:26/09/2018
Date Completed:26/09/2018

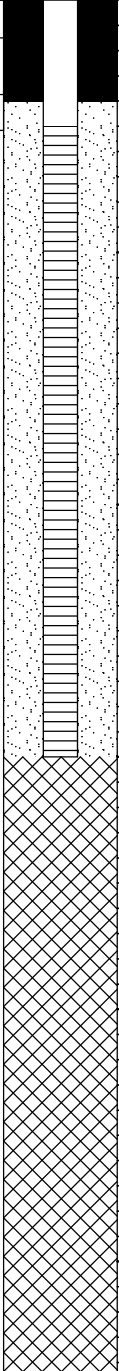
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.25 0.35 0.35 0.45 0.45 0.55 0.55 0.65 0.65 0.75 0.85 0.95 1.00- 1.45 1.45 1.55 1.55 1.65 1.75 1.85 1.95 2.00- 2.45 3.00- 3.45 3.45 3.55 3.65 3.65 3.75 3.85 3.95 4.00- 4.45 4.45 4.45 4.55 4.55 4.65 4.75 4.85 5.00- 5.45	WS1 WS1 WS1 WS1 <							

 AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com					Window Sampler Log No. WS2 Sheet: 1 of 1						
Equipment & Methods. PM Sampling Ltd Support Used: None					Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd					Job No: A1816	
Co-ordinates: E: N:					Ground Level (m):		Date Started: 26/09/2018 Date Completed: 26/09/2018				
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)			
Depth (m)	No.	Type	Result								
0.15	WS2	J	PP=25.0	1,2/1,1,1,2	MADE GROUND: Turf over topsoil	-0.15		(0.15)			
0.25	WS2	TUB D	PP=69.0		(Made Ground)			(0.40)			
0.35			PP=64.0								
0.45	WS2	J	PP=132.0		Fine, sandy brown, coarse SILT						
0.55			PP=20.0		(Tidal Flat Deposits)						
0.65	WS2	TUB D	PP=15.0		Fine to medium yellow brown SAND with minor coarse silt	-0.55		0.55			
0.75			PP=39.0		(Tidal Flat Deposits)						
0.85	WS2	D	PP=34.0								
0.95			PP=34.0								
1.40	WS2	D	SN=5								
1.55	WS2	D	PP=25.0	...from 1.60 Increases in wetness							
1.65			PP=20.0								
1.75			PP=25.0								
1.85			PP=34.0								
1.95	WS2	D	PP=5.0								
2.40			SN=0								
2.55			PP=20.0	...from 2.40 Waterlogged sample							
2.65			PP=15.0								
2.75	WS2	D	PP=15.0								
2.85			PP=25.0								
2.95			PP=29.0								
			SN=1								
3.75	WS2	D	PP=25.0	1,1/-,1,-,-							
3.85			PP=44.0								
3.95			PP=29.0								
			SN=13								
4.55	WS2	D	PP=64.0	2,2/3,3,3,4							
4.90											
			SN=12								
				2,3/2,3,3,4							
Remarks:						Logged By: CS		Checked By:			
						Scale: 1:50		Approved By:			
Notes: For explanation of symbols and abbreviations, see Key Sheet.						FIG No. Fig 2					

Job No:
A1816

Date Started:26/09/2018
Date Completed:26/09/2018

Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result					
0.15 0.20 0.35 0.45 0.70	WS3 WS3 WS3	J TUB D	PP=44.0 PP=88.0 PP=162.0 PP=152.0	1,2/2,2,1,2	MADE GROUND: Turf over brown topsoil (Made Ground)	-0.30		(0.30) 0.30
1.20 1.00- 1.45	WS3 WS3	D SPTLS	SN=7		Fine to medium SAND with minor coarse silt (Tidal Flat Deposits)			(1.70)
1.70	WS3	D						
2.20 2.00- 2.45	WS3 WS3	D SPTLS	SN=3		Fine sandy dark brown / grey coarse SILT (Tidal Flat Deposits)	-2.00 -2.30		2.00 (0.30) 2.30
2.70	WS3	D		1,1/-,-,1,2	Fine to medium yellow / brown sandy, coarse SILT (Tidal Flat Deposits)			(0.70)
3.00- 3.45 3.45 3.55 3.65 3.75 3.85 3.95 4.00- 4.45	WS3 WS3 WS3 WS3	SPTLS D SPTLS	SN=4 PP=34.0 PP=34.0 PP=25.0 PP=39.0 PP=20.0 PP=20.0 SN=7	2,2/1,1,1,1	Fine to medium dark brown / grey SAND with coarse silt (Tidal Flat Deposits)	-3.00		2.00 (0.30) 2.30
4.65 4.70 4.75 4.85 4.95 5.00- 5.45	WS3 WS3 WS3	D SPTLS	PP=25.0 PP=64.0 PP=49.0 PP=54.0 SN=11	1,1/1,1,2,3		-5.45		3.00 (2.45)
						End of W/S 5.45 m (Thickness of basal layer not proven)		
Remarks:						Logged By:		Checked By:
						CS		
						Scale: 1:50		Approved By:
						FIG No.		
Notes: For explanation of symbols and abbreviations, see Key Sheet.						Fig 2		

AGS AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com					Hole ID. WS3 Installation Details & Readings Sheet: 1 of 1						
Equipment Used:None				Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd				Job No: A1816			
Co-ordinates: E: N:				Ground Level (m):		Date Started:26/09/2018 Date Completed:26/09/2018					
Installation Date : 26/09/2018 Installation Type : SP						Depth to TOP Response Zone : 0.5 (m) Depth to BASE Response Zone : 4 (m)		Installation Diagram	Depth Related Remarks (Elevation)		
Readings											
Date		Time	Depth to Water (b.e.g.l) (m)		Head of Water Above Tip (m)	Remarks					
27:09:2018		00:00	2.73								
								0.4 Bentonite Seal (-0.50) 3 Gravel filter (-4.00) Hole collapsed End of Hole 5.45 m			
								Compiled By: CS		Checked By:	
								Scale:		Approved By:	
								FIG No.			
Notes: For explanation of symbols and abbreviations, see Key Sheet.											

Job No:
A1816

Date Started:26/09/2018
Date Completed:26/09/2018

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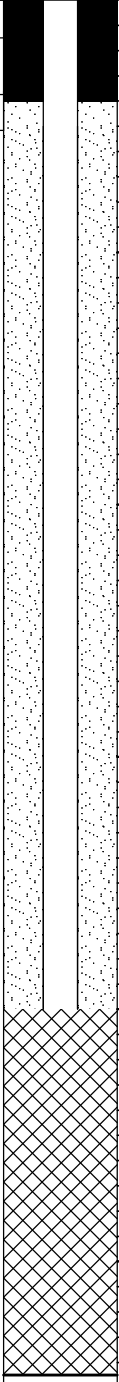
AGS Ground Solutions Ltd

4 Bond Street, Redruth, Cornwall TR15 2QB
01209 202 409
agsgroundsolutions.com

Hole ID. WS4

Installation Details & Readings

Sheet: 1 of 1

Equipment Used:None Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd		Job No: A1816												
Co-ordinates: E: N:		Ground Level (m):	Date Started:26/09/2018 Date Completed:26/09/2018											
Installation Date : 26/09/2018 Depth to TOP Response Zone : 0.5 (m) Installation Type : SP Depth to BASE Response Zone : 4 (m)			Installation Diagram	Depth Related Remarks (Elevation)										
Readings <table> <tr> <th>Date</th> <th>Time</th> <th>Depth to Water (b.e.g.l) (m)</th> <th>Head of Water Above Tip (m)</th> <th>Remarks</th> </tr> <tr> <td>27/09/2018</td> <td>00:00</td> <td>2.58</td> <td></td> <td></td> </tr> </table>					Date	Time	Depth to Water (b.e.g.l) (m)	Head of Water Above Tip (m)	Remarks	27/09/2018	00:00	2.58		
Date	Time	Depth to Water (b.e.g.l) (m)	Head of Water Above Tip (m)	Remarks										
27/09/2018	00:00	2.58												
 Bentonite seal 0.4 (-0.50) Gravel filter with geosock 4 (-4.00) Hole collapsed End of Hole 5.45 m														
Notes: For explanation of symbols and abbreviations, see Key Sheet.			Compiled By: CS	Checked By:										
			Scale:	Approved By:										
			FIG No.											

Job No:
A1816

Date Started:27/09/2018
Date Completed:27/09/2018

AGS-GS STANDARD WINDOW SAMPLER LOG V2 A1816 SUTTON BRIDGE.GPJ GSG-AGS3-STD TEMPLATE.GDT 4/10/18

AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com Window Sampler Log No. WS6 Sheet: 1 of 1																																																																																																																																												
Equipment & Methods. PM Sampling Ltd Support Used: None			Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd		Job No: A1816																																																																																																																																							
Co-ordinates: E: N:			Ground Level (m):		Date Started: 27/09/2018 Date Completed: 27/09/2018																																																																																																																																							
Samples and In situ Testing <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 15%;">Depth (m)</th> <th style="width: 10%;">No.</th> <th style="width: 10%;">Type</th> <th style="width: 25%;">Result</th> </tr> </thead> <tbody> <tr> <td>0.10-0.20</td> <td>WS6</td> <td>D</td> <td>PP=294.0 PP=294.0</td> </tr> <tr> <td>0.25</td> <td></td> <td></td> <td></td> </tr> <tr> <td>0.45</td> <td></td> <td></td> <td>PP=137.0 PP=235.0</td> </tr> <tr> <td>0.50-0.70</td> <td>WS6</td> <td>D</td> <td></td> </tr> <tr> <td>0.85</td> <td></td> <td></td> <td>PP=177.0 PP=108.0</td> </tr> <tr> <td>0.95</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.00-1.25</td> <td>WS6</td> <td>D</td> <td></td> </tr> <tr> <td>1.00-1.45</td> <td>WS6</td> <td>SPTLS</td> <td>SN=15</td> </tr> <tr> <td>1.55</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.60-1.70</td> <td>WS6</td> <td>D</td> <td>PP=10.0 PP=20.0 PP=39.0 PP=59.0</td> </tr> <tr> <td>1.65</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.75</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.85</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.00-2.45</td> <td>WS6</td> <td>D</td> <td></td> </tr> <tr> <td>2.55</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.50-2.70</td> <td>WS6</td> <td>D</td> <td>PP=69.0</td> </tr> <tr> <td>2.75</td> <td></td> <td></td> <td>PP=59.0 PP=44.0 PP=29.0</td> </tr> <tr> <td>2.85</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2.95</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3.00-3.20</td> <td>WS6</td> <td>D</td> <td></td> </tr> <tr> <td>3.00-3.45</td> <td>WS6</td> <td>SPTLS</td> <td>SN=25</td> </tr> <tr> <td>3.55</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3.65</td> <td></td> <td></td> <td>PP=88.0 PP=69.0 PP=167.0 PP=88.0</td> </tr> <tr> <td>3.75</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3.85</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4.00-4.20</td> <td>WS6</td> <td>D</td> <td></td> </tr> <tr> <td>4.00-4.45</td> <td>WS6</td> <td>SPTLS</td> <td>SN=17</td> </tr> <tr> <td>4.55</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4.75</td> <td></td> <td></td> <td>PP=54.0</td> </tr> <tr> <td>4.85</td> <td></td> <td></td> <td>PP=98.0 PP=64.0 PP=39.0</td> </tr> <tr> <td>4.95</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5.00-5.45</td> <td>WS6</td> <td>SPTLS</td> <td>SN=13</td> </tr> </tbody> </table> Field Records 2,2/3,4,4,4 3,3/4,4,3,4 4,5/5,6,7,7 3,4/5,4,4,4 2,3/3,4,3,3				Depth (m)	No.	Type	Result	0.10-0.20	WS6	D	PP=294.0 PP=294.0	0.25				0.45			PP=137.0 PP=235.0	0.50-0.70	WS6	D		0.85			PP=177.0 PP=108.0	0.95				1.00-1.25	WS6	D		1.00-1.45	WS6	SPTLS	SN=15	1.55				1.60-1.70	WS6	D	PP=10.0 PP=20.0 PP=39.0 PP=59.0	1.65				1.75				1.85				2.00-2.45	WS6	D		2.55				2.50-2.70	WS6	D	PP=69.0	2.75			PP=59.0 PP=44.0 PP=29.0	2.85				2.95				3.00-3.20	WS6	D		3.00-3.45	WS6	SPTLS	SN=25	3.55				3.65			PP=88.0 PP=69.0 PP=167.0 PP=88.0	3.75				3.85				4.00-4.20	WS6	D		4.00-4.45	WS6	SPTLS	SN=17	4.55				4.75			PP=54.0	4.85			PP=98.0 PP=64.0 PP=39.0	4.95				5.00-5.45	WS6	SPTLS	SN=13	DESCRIPTION		Reduced Level (m)	Legend	Depth (Thick) (m)
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5.00-5.45	WS6	SPTLS	SN=13																																																																																																																																									
MADE GROUND: Turf over topsoil (Made Ground)			-0.20		(0.20)																																																																																																																																							
Fine light brown sandy firm SILT (Tidal Flat Deposits)			...from 0.50 Occasional sand bands																																																																																																																																									
...from 2.80 Becoming dark grey with organic material			(5.25)																																																																																																																																									
End of W/S 5.45 m (Thickness of basal layer not proven)			-5.45		5.45																																																																																																																																							

Remarks:

Notes: For explanation of symbols and abbreviations, see Key Sheet.

Logged By: CS

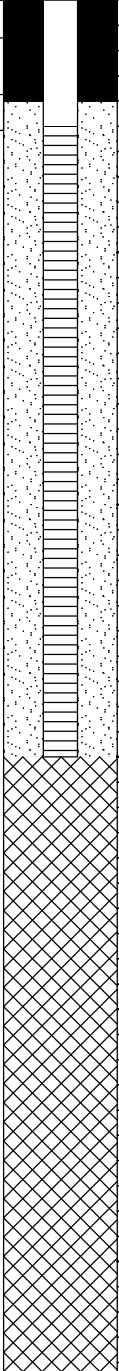
Scale: 1:50

FIG No. **Fig 2**

AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com Window Sampler Log No. WS7 Sheet: 1 of 1											
Equipment & Methods. PM Sampling Ltd Support Used: None			Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd		Job No: A1816						
Co-ordinates: E: N:			Ground Level (m):		Date Started: 27/09/2018 Date Completed: 27/09/2018						
Samples and In situ Testing				Field Records		DESCRIPTION		Reduced Level (m)	Legend	Depth (Thick) (m)	
Depth (m)	No.	Type	Result								
0.10	WS7	J TUB				MADE GROUND: Turf over topsoil (Made Ground)		-0.40		(0.40)	
0.35	WS7	D	PP=118.0			Fine light brown / yellow sandy, firm SILT (Tidal Flat Deposits)				0.40	
0.40-0.50	WS7	J TUB	PP=157.0								
0.50	WS7										
0.75			PP=152.0								
0.85			PP=93.0								
0.90-1.00	WS7	D									
1.10-1.20	WS7	D									
1.00-1.45	WS7	SPTLS	SN=10	2,2/2,2,3,3							
1.55			PP=44.0								
1.65			PP=44.0								
1.75			PP=59.0								
1.80-2.00	WS7	D	PP=49.0								
2.00-2.45	WS7	SPTLS	SN=14	2,2/3,4,4,3							
2.20-2.30	WS7	D									
2.55			PP=34.0								
2.65			PP=39.0								
2.75			PP=39.0								
2.80-3.00	WS7	D	PP=39.0			Fine dark grey / dark brown sandy, firm SILT (Tidal Flat Deposits)		-2.80		2.80	
2.95			PP=59.0								
3.00-3.45	WS7	SPTLS	SN=17	3,4/4,5,4,4							
3.55			PP=49.0								
3.65			PP=83.0								
3.75			PP=108.0								
3.80-4.00	WS7	D	PP=69.0			...from 3.50 to 5.00 Becoming incredibly waterlogged					
3.85			PP=78.0								
3.95			SN=10								
4.00-4.45	WS7	SPTLS		4,4/3,3,2,2							
4.55			PP=44.0								
4.65			PP=59.0								
4.75			PP=69.0								
4.80-5.00	WS7	D	PP=69.0								
4.85			PP=39.0								
4.95			SN=11								
5.00-5.45	WS7	SPTLS		2,2/3,2,3,3				-5.45		5.45	
								End of W/S 5.45 m (Thickness of basal layer not proven)			
Remarks:								Logged By: CS		Checked By:	
								Scale: 1:50		Approved By:	
Notes: For explanation of symbols and abbreviations, see Key Sheet.								FIG No. Fig 2			

AGS-GS STANDARD WINDOW SAMPLER LOG V2 A1816 SUTTON BRIDGE.GPJ GSG-AGS3-STD TEMPLATE.GDT 4/10/18

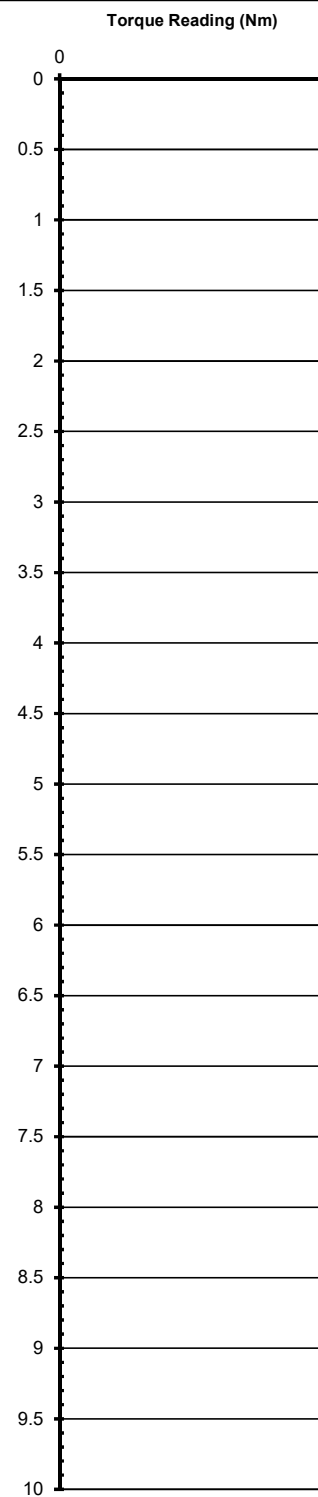
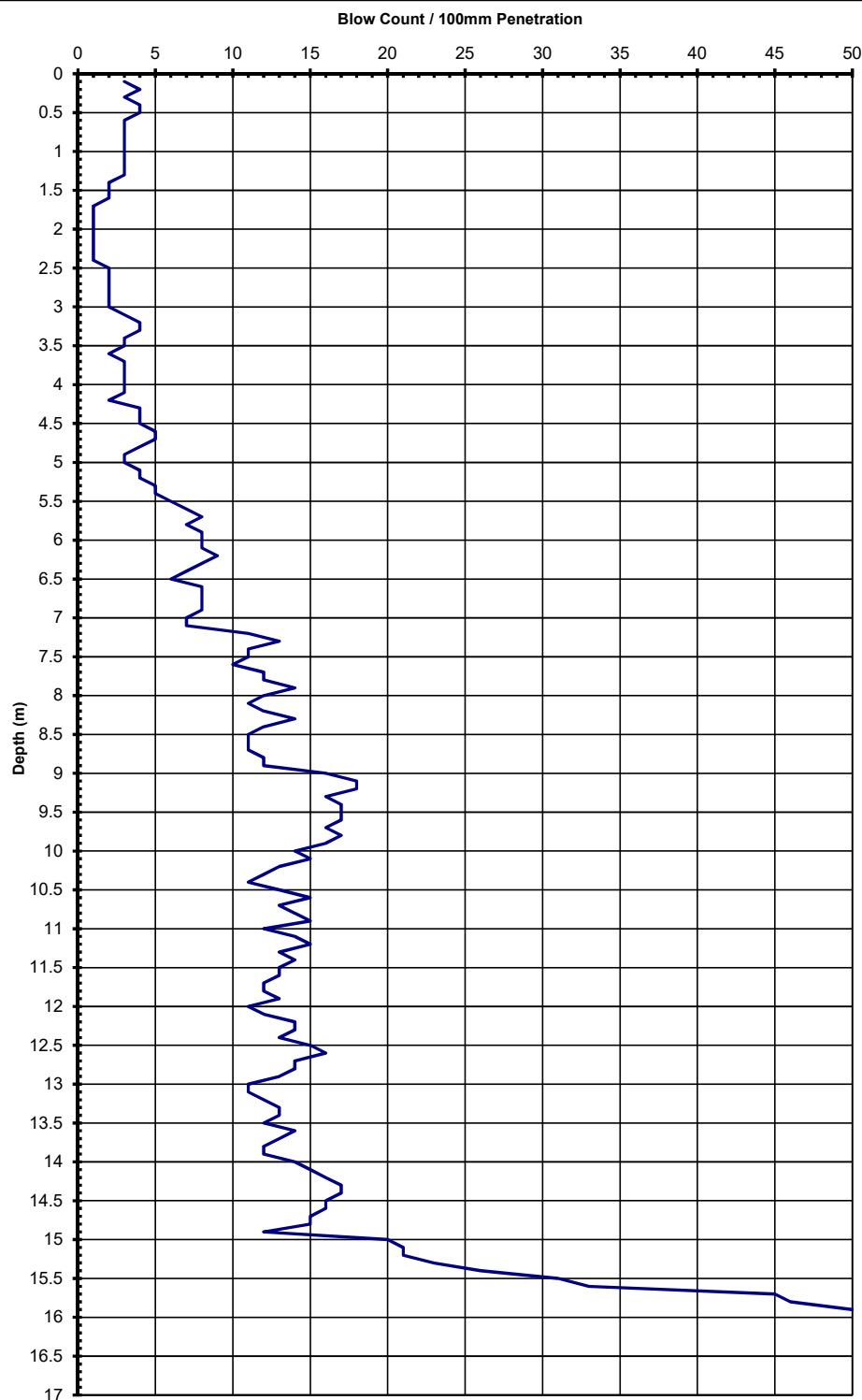
AGS AGS Ground Solutions Ltd AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com					Window Sampler Log No. WS8 Sheet: 1 of 1												
Equipment & Methods. PM Sampling LtdSupport Used:None					Project Name: Sutton Bridge					Job No: A1816							
					Project Location: Spalding, Lincolnshire												
					Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd												
Co-ordinates: E: N:					Ground Level (m):					Date Started:27/09/2018 Date Completed:27/09/2018							
Samples and In situ Testing					Field Records					DESCRIPTION					Reduced Level (m)	Legend	Depth (Thick) (m)
Depth (m)	No.	Type	Result														
0.05	WS8	D	PP=240.0	3,2/3,3,4,3	MADE GROUND: Turf over topsoil (Made Ground)	-0.40		(0.40)									
0.10- 0.30	WS8	J	PP=294.0														
0.25	WS8	TUB	PP=196.0														
0.35	WS8	D	PP=54.0	3,3/3,4,4,3	Fine light brown sandy SILT, with occasional silty sand layers (Tidal Flat Deposits)	-1.60		(1.20)									
0.40- 0.50	WS8	D	PP=0.0														
0.45	WS8	D	PP=157.0														
0.50- 0.80	WS8	D	PP=98.0	3,3/3,4,4,3	Fine dark brown / grey sandy coarse SILT (Tidal Flat Deposits)	-5.45		(3.85)									
0.65	WS8	D	PP=103.0														
0.75	WS8	D	PP=103.0														
1.00- 1.45	WS8	SPTLS	SN=13	2,4/5,6,5,5													
1.20- 1.30	WS8	D	PP=20.0														
1.40- 1.50	WS8	J	PP=34.0														
1.55	WS8	TUB	PP=29.0	2,3/3,4,3,3													
1.65	WS8	D	PP=39.0														
1.70- 1.80	WS8	D	PP=29.0														
1.75	WS8	D	PP=29.0	2,3/3,2,3,3													
1.85	WS8	D	PP=34.0														
1.95	WS8	D	PP=34.0														
2.00- 2.45	WS8	SPTLS	SN=14	2,3/3,2,3,3													
2.20- 2.30	WS8	D	PP=44.0														
2.55	WS8	D	PP=44.0														
2.65	WS8	D	PP=49.0	2,3/3,2,3,3													
2.70- 2.80	WS8	D	PP=49.0														
2.75	WS8	D	PP=49.0														
2.85	WS8	D	PP=49.0	2,3/3,2,3,3													
2.95	WS8	D	PP=34.0														
3.00- 3.45	WS8	SPTLS	SN=21														
3.55	WS8	D	PP=44.0	2,3/3,2,3,3													
3.65	WS8	D	PP=44.0														
3.70- 3.80	WS8	D	PP=39.0														
3.75	WS8	D	PP=15.0	2,3/3,2,3,3													
3.85	WS8	D	PP=20.0														
3.95	WS8	D	PP=20.0														
4.00- 4.45	WS8	SPTLS	SN=13	2,3/3,2,3,3													
4.55	WS8	D	PP=44.0														
4.65	WS8	D	PP=44.0														
4.70- 4.80	WS8	D	PP=49.0	2,3/3,2,3,3													
4.75	WS8	D	PP=69.0														
4.85	WS8	D	PP=69.0														
4.95	WS8	D	PP=69.0	2,3/3,2,3,3													
5.00- 5.45	WS8	SPTLS	SN=11														
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	WS8	D	PP=69.0	2,3/3,2,3,3													
	WS8	D	PP=69.0														
	WS8	D	PP=69.0														
	WS8	D															

AGS AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundolutions.com					Hole ID. WS8 Installation Details & Readings Sheet: 1 of 1												
Equipment Used:None				Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd				Job No: A1816									
Co-ordinates: E: N:				Ground Level (m):		Date Started:27/09/2018 Date Completed:27/09/2018											
Installation Date : 27/09/2018 Installation Type : SP						Depth to TOP Response Zone : 0.5 (m) Depth to BASE Response Zone : 3 (m)		Installation Diagram		Depth Related Remarks (Elevation)							
Readings																	
Date		Time		Depth to Water (b.e.g.l) (m)		Head of Water Above Tip (m)		Remarks									
27:09:2018		00:00		1.47													
										0.4		Bentonite seal (-0.50)					
										3		Hole collapsed					
												End of Hole 5.45 m					
Notes: For explanation of symbols and abbreviations, see Key Sheet.										Compiled By: CS		Checked By:					
										Scale:		Approved By:					
										FIG No.							

Appendix 3

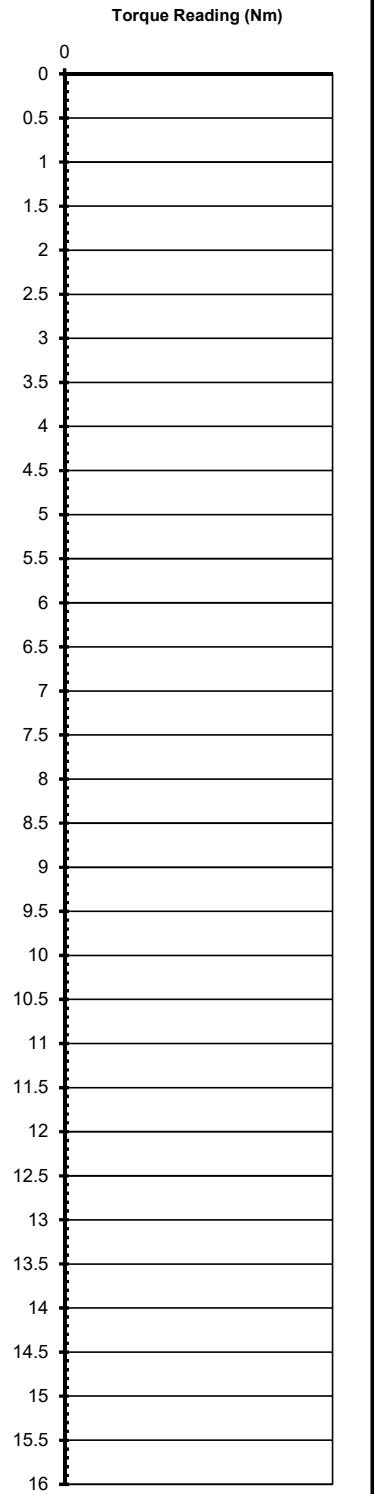
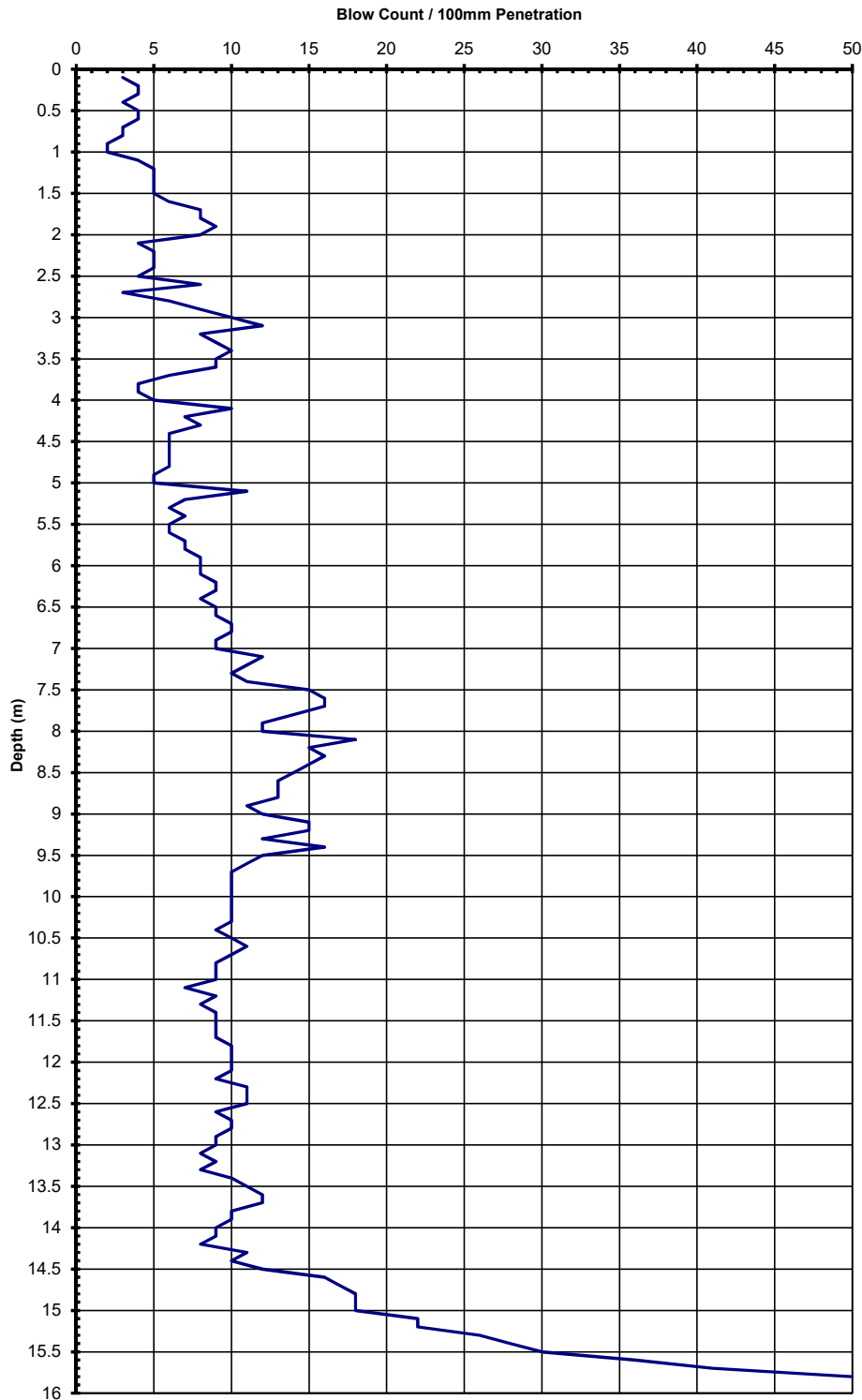
Dynamic Probe Soundings

DYNAMIC PROBE TEST RESULTS						Probe No:	DP1 (WS9)
Project Name:	Sutton Bridge					Lab. Order No:	n/a
Client Name:	Lincoln Jack Ltd					Project No:	A1816
Hammer Weight:	63.5 kg	Cone Diameter:	50.5 +/- .5			Date:	03/10/2018
Hammer Drop:	750 +/- 20	Rod Diameter:	35 mm			Ground Level (m)	0.00



AGS Ground Solutions www.agsgroundolutions.com		
Tested By: PM Sampling	Approved By: PF	
Checked By: CS		

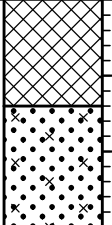
DYNAMIC PROBE TEST RESULTS						Probe No:	DP2 (WS10)
Project Name:	Sutton Bridge					Lab. Order No:	n/a
Client Name:	Lincoln Jack Ltd					Project No:	A1816
Hammer Weight:	63.5 kg	Cone Diameter:	50.5 +/- .5			Date:	03/10/2018
Hammer Drop:	750 +/- 20	Rod Diameter:	35 mm			Ground Level (m)	0.00



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Tested By: PMS	Approved By: PF	
Checked By: CS		

Appendix 4

Trial Pit Logs

 AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com					Trial Pit No. TP1 Trial Pit Log Sheet: 1 of 1						
Equipment & Methods. Pit Dimensions 1.60m by 0.65m. Support Used:None					Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd					Job No: A1816	
Co-ordinates: E: N:					Ground Level (m):		Date Started:27/09/2018 Date Completed:27/09/2018				
Samples and In situ Testing				Field Records	DESCRIPTION			Reduced Level (m)	Legend	Depth (Thick) (m)	
Depth (m)	No.	Type	Result								
0.70 0.70- 0.90 1.40	TP1 TP1 TP1	D U38 D J TUB		140 blows	MADE GROUND: Turf over topsoil (Made Ground)			-0.70		(0.70)	
					Fine yellow/brown SAND with abundant coarse silt. Little to no plasticity, and some cohesion (Tidal Flat Deposits)					0.70 (0.80)	
								-1.50		1.50	
								End of Trial Pit 1.50 m (Thickness of basal layer not proven)			
Remarks:								Logged By: CS	Checked By:		
								Scale: 1:50	Approved By:		
Notes: For explanation of symbols and abbreviations, see Key Sheet.								FIG No.		Fig 2	

Job No:
A1816

Date Started:27/09/2018
Date Completed:27/09/2018

End of Trial Pit 1.50 m
(Thickness of basal layer
not proven)

FIG No. **Fig 2**

Notes: For explanation of symbols and abbreviations, see Key Sheet.

Job No:
A1816

Date Started:27/09/2018
Date Completed:27/09/2018

End of Trial Pit 3.00 m
(Thickness of basal layer not proven)

FIG No. **Fig 2**

AGS-GS STANDARD TRIAL PIT LOG V2 A1816 SUTTON BRIDGE.GPJ GSG-AGS3-STD TEMPLATE.GDT 4/10/18

Job No:
A1816

Date Started:27/09/2018
Date Completed:27/09/2018

End of Trial Pit 3.00 m
(Thickness of basal layer not proven)

FIG No. **Fig 2**

Notes: For explanation of symbols and abbreviations, see Key Sheet.

Job No:
A1816

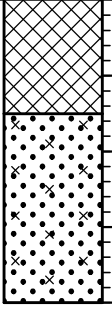
Date Started:27/09/2018
Date Completed:27/09/2018

Reduced Level (m)	Legend	Depth (Thick) (m)
-0.65		(0.65)
-2.00		0.65 (1.35) 2.00

End of Trial Pit 2.00 m
(Thickness of basal layer not proven)

FIG No. **Fig 2**

Notes: For explanation of symbols and abbreviations, see Key Sheet.

 AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com					Trial Pit No. TP6 Trial Pit Log Sheet: 1 of 1						
Equipment & Methods. Pit Dimensions 2.20m by 0.70m. Support Used:None					Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd					Job No: A1816	
Co-ordinates: E: N:					Ground Level (m):		Date Started:27/09/2018 Date Completed:27/09/2018				
Samples and In situ Testing				Field Records	DESCRIPTION	Reduced Level (m)	Legend	Depth (Thick) (m)			
Depth (m)	No.	Type	Result								
0.90- 1.10 1.00	TP6	U38 D		78 blows	MADE GROUND: Turf over topsoil (Made Ground)	-0.75		(0.75) 0.75 (1.25) 2.00			
2.00	TP6	D			Fine yellow/brown SAND with abundant coarse silt. Little to no plasticity, and some cohesion (Tidal Flat Deposits)	-2.00		End of Trial Pit 2.00 m (Thickness of basal layer not proven)			
Remarks:						Logged By: CS		Checked By:			
Notes: For explanation of symbols and abbreviations, see Key Sheet.						Scale: 1:50		Approved By:			
						FIG No. Fig 2					

Job No:
A1816

Date Started:27/09/2018
Date Completed:27/09/2018

Reduced Level (m)	Legend	Depth (Thick) (m)
-0.40		(0.40)
		0.40
		(1.80)
-2.20		2.20

End of Trial Pit 2.20 m
(Thickness of basal layer not proven)

FIG No. **Fig 2**

Notes: For explanation of symbols and abbreviations, see Key Sheet.

AGS Ground Solutions Ltd 4 Bond Street, Redruth, Cornwall TR15 2QB 01209 202 409 agsgroundsolutions.com Trial Pit No. TP8 Trial Pit Log Sheet: 1 of 1																		
Equipment & Methods. Pit Dimensions 2.20m by 0.70m. Support Used:None					Project Name: Sutton Bridge Project Location: Spalding, Lincolnshire Client: Lincoln Jack Ltd / Alan Brown Development Services Ltd					Job No: A1816								
Co-ordinates: E: N:					Ground Level (m):					Date Started:27/09/2018 Date Completed:27/09/2018								
Samples and In situ Testing										DESCRIPTION					Reduced Level (m)	Legend	Depth (Thick) (m)	
Depth (m)	No.	Type	Result	Field Records														
0.10	TP8	J TUB		115 blows					MADE GROUND: Turf over topsoil (Made Ground)					-0.40		(0.40) 0.40		
0.90- 1.10	TP8	U38							Fine yellow/brown SAND with abundant coarse silt. Little to no plasticity, and some cohesion (Tidal Flat Deposits)					(1.70)				
1.60	TP8	D																
2.10	TP8	D																
															-2.10	End of Trial Pit 2.10 m (Thickness of basal layer not proven)		
Remarks:															Logged By: CS		Checked By:	
															Scale: 1:50		Approved By:	
															FIG No. Fig 2			
Notes: For explanation of symbols and abbreviations, see Key Sheet.																		

Appendix 5

Percolation Test Results

Soakaway Test Pit Results

Job Number: A1816	Trial Pit: TP1
Site: Sutton Bridge	Test No: 1
Location: Spalding, Lincolnshire	Of: 1
Client: Lincoln Jack Ltd / ABDS	Date: 03/10/2018
	Weather: Overcast / Windy

TRIAL PIT DIMENSIONS

Length (m): 1.6

Width (m): 0.65

Depth (m): 1.5

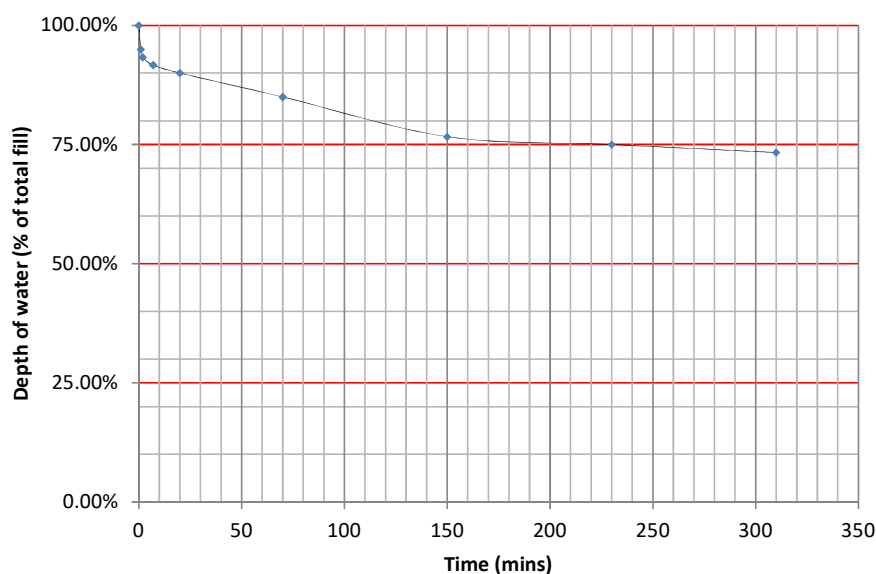
Invert Depth (m): 0.9

Test Time (mins): 310

% Drained: 26.67%

SOAKAGE RESULTS

Depth	(%)	Time
0.9	100.00%	0
0.93	95.00%	1
0.94	93.33%	2
0.95	91.67%	7
0.96	90.00%	20
0.99	85.00%	70
1.04	76.67%	150
1.05	75.00%	230
1.06	73.33%	310



INFILTRATION RATE

Depth (B.G.L) (m)	Infiltration Rate (m/s)
0.9 - 1.5	2.23E-07

Notes:

Departures from Specified Test Method:

Tested / Input By: CS Date: 03-Oct	Checked By: PF Date: 03-Oct	Approved By: PF Date: 03-Oct
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Soakaway Test Pit Results

Job Number: A1816	Trial Pit: TP2
Site: Sutton Bridge	Test No: 1
Location: Spalding, Lincolnshire	Of: 1
Client: Lincoln Jack Ltd / ABDS	Date: 03/10/2018
	Weather: Overcast / Windy

TRIAL PIT DIMENSIONS

Length (m): 1.6

Width (m): 0.65

Depth (m): 1.5

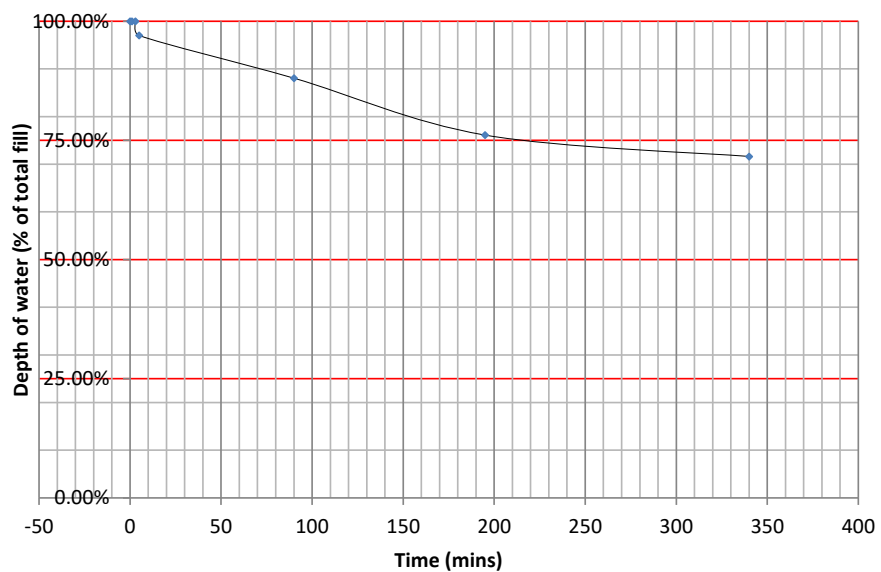
Invert Depth (m): 0.83

Test Time (mins): 340

% Drained: 28.36%

SOAKAGE RESULTS

Depth	(%)	Time
0.83	100.00%	0
0.83	100.00%	1
0.83	100.00%	3
0.85	97.01%	5
0.91	88.06%	90
0.99	76.12%	195
1.02	71.64%	340



INFILTRATION RATE

Depth (B.G.L) (m)	Infiltration Rate (m/s)
0.83 - 1.5	2.71E-07

Notes:

Departures from Specified Test Method:

Tested / Input By: CS Date: 03-Oct	Checked By: PF Date: 03-Oct	Approved By: PF Date: 03-Oct
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