

20th December 2018
314228 L01 (00)

Blue Cedar Homes Limited
220 Park Avenue
Aztec West
Almondsbury
Bristol
BS32 4SY

FACTUAL INFILTRATION TESTING REPORT, LAND SOUTH OF CASTLE STREET, DEDDINGTON

For the Attention of Jon Symons,

This letter presents the results of infiltration testing undertaken for the Land South of Castle Street, Deddington. RSK's service constraints are presented within **Appendix A**.

1. SITE DESCRIPTION AND SETTING

The site is situated on the eastern edge of Deddington, Oxfordshire and set within a mixed agricultural and residential setting. The site is accessed via a shared entrance from Castle Street in the north west corner. The site comprises a single large grassed field, with a large mature trees and shrubs along the northern and southern boundaries, occasional mature trees also lie along the eastern boundary. **Figure 1** shows the site location.

The residential village of Deddington is located to the west of the site, including a primary school offsite to the north-west. Agricultural fields are located south beyond the ruin of Deddington Castle, residential housing is to the east and north.

The northern two thirds of the site is generally level, with the southern third sloping gently downwards towards the south.

Based on a review of the British Geological Society (BGS) records for the site, the site is believed to be underlain by bedrock deposits of the Marlstone Rock Formation.

2. PROPOSED DEVELOPMENT

It is understood that the site is proposed to be developed for residential end use. A proposed layout plan has not been provided to RSK.

3. SITE INVESTIGATION METHODOLOGY

RSK carried out intrusive investigation work on 4th December 2018, to determine existing ground conditions and conduct trial pit soakaways. The works were undertaken to provide an indication of the likely infiltration rates at the site.

3.1 Methodology

A non-targeted investigation was undertaken for the site to provide general information for soakaway placement. A total of 3 No. trial pits were undertaken following the Client's requested methodology and given the area of the site.

The 3 No. trial pits were excavated (TP1 - TP3) using mechanical excavation techniques. The locations and depths of the soakaway test pits were chosen by RSK, in order to provide a general spread across the site.

3.2 Investigation Locations

The investigation and the soil descriptions were carried out in general accordance with BS5930: 2015 - Code of Practice for Ground Investigations. A photographic log of the investigation works is presented as **Appendix B** and the exploratory hole logs and other site work records are presented in **Appendix C**.

The locations of the intrusive investigations are shown in **Figure 2**.

3.3 Soil Sampling

No laboratory testing was required by the client, as such, no soil samples were taken during the investigation.

4. SITE GEOLOGY

A summary of ground conditions encountered during the intrusive works is outlined in the following sections. Generally, the site was underlain by Topsoil over bedrock deposits of the Marlstone Rock Formation. No Made Ground was encountered during the investigation.

The exploratory logs are summarised in **Table 1** and reported in detail in **Appendix C**. Exploratory hole locations are shown on the site plan in **Figure 2**.

Table 1: Geology at the site based on published data.

Stratum	Exploratory holes encountered	Depth to top of stratum m bgl	Proven thickness (m)
Topsoil	TP1 - TP3	Ground level	0.30
Marlstone Rock Formation		0.30	>0.75 - >1.30

4.1.1 Topsoil

The Topsoil generally comprised a cohesive soil comprising a brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded, fine to coarse of limestone and quartzite. The base of the Topsoil was encountered at 0.30 m bgl in all locations.

4.1.2 Marlstone Rock Formation

This stratum was encountered from beneath the Topsoil in all locations and comprised a orangish brown slightly sandy slightly gravelly silty CLAY to depths of between 0.90 - 1.40 m bgl. The gravel is subangular to subrounded, fine to coarse of ironstone, limestone and quartzite. This layer was further underlain by a strong brownish grey LIMESTONE recovered as gravels and cobbles.

4.1.3 Groundwater

No groundwater was encountered during the intrusive investigation

4.1.4 Visual/olfactory evidence of soil contamination

No visual or olfactory evidence of soil contamination was encountered during the intrusive investigation.

5. INFILTRATION TESTING

Trial pit soakaway tests were carried out at each location, the results of which are summarised in **Table 2**. The test certificates are presented within **Appendix D**.

Table 2: Trial pit infiltration rates

Trial Pit	Test base depth (m bgl)			Length of test (minutes)			Infiltration rate (m/s)		
	1	2	3	1	2	3	1	2	3
TP1	1.05	1.05	-	26	32	-	7.89x10 ⁻⁵	6.46x10⁻⁵	-
TP2	1.58	1.57	-	16	16	-	1.19x10⁻⁴	1.26x10 ⁻⁴	-
TP3	1.46	1.46	1.42	9	11	12	2.36x10 ⁻⁴	2.11x10 ⁻⁴	1.91x10⁻⁴

Notes: m bgl - metres below ground level
 N/A - Infiltration rate could not be calculated as the required intercepts were not met.
 * Infiltration was calculated via extrapolation, therefore, should be used as indicative only.
BOLD - Infiltration rate should be adopted in the area of this trial pit.

6. CONCLUSION

6.1 Soakaway design

Finished heights and final layout of the development is not known however, in general terms groundwater levels would need to be at least 1m below any infiltration feature. Infiltration rates less than 1.0 x 10⁻⁶ are considered not to be sufficient to offer an infiltration based solution, Infiltration rates may be sufficient however further drainage design works would be required to determine if this offers a suitable solution.

Yours sincerely

For RSK Environment Limited



Andy Denton

Geo-environmental Consultant



Sophie Penney

Principal Consultant



Enc.

Figure 1 - Site location plan

Figure 2 - Exploratory hole location plan

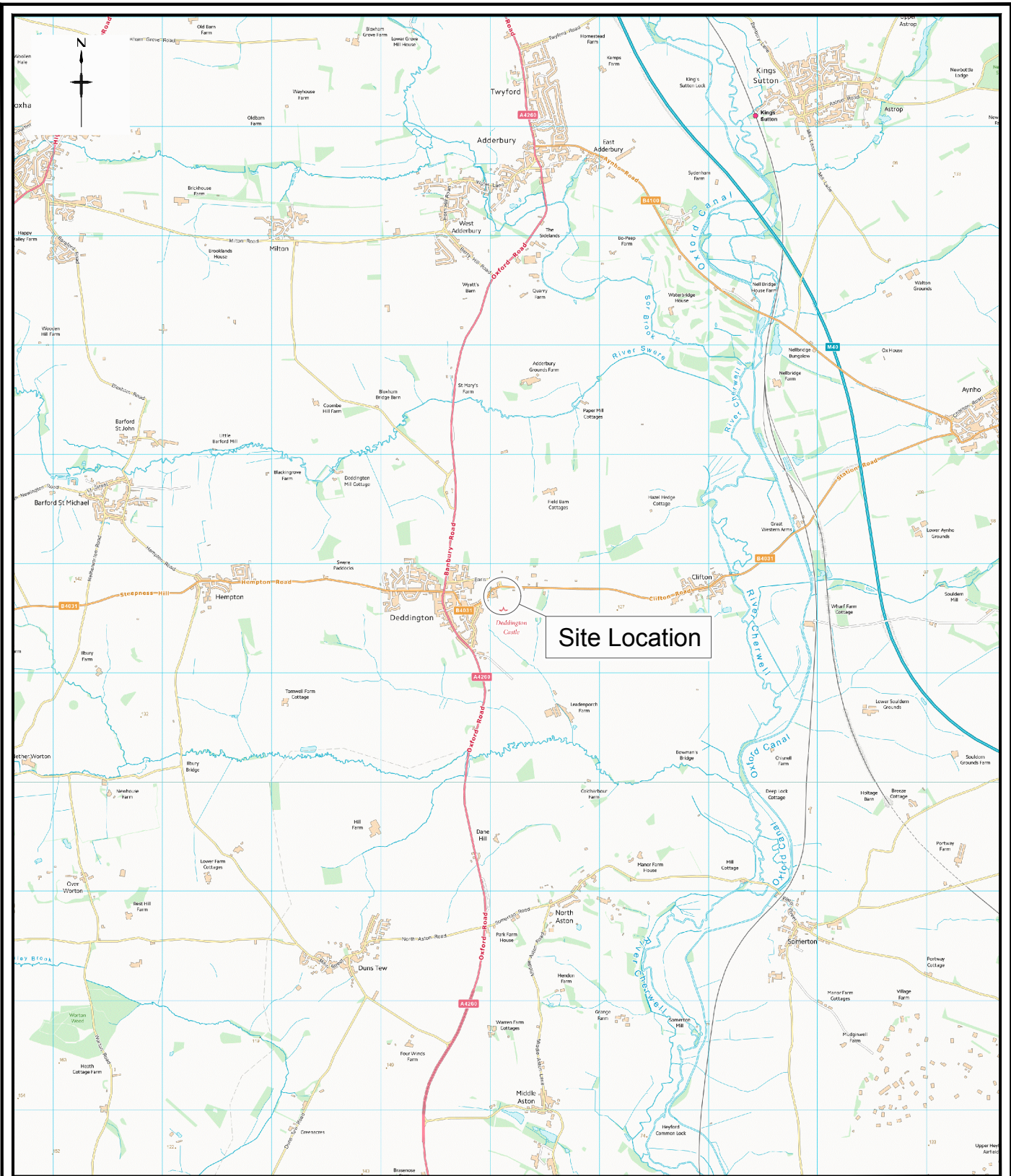
Appendix A - RSK service constraints

Appendix B - Photographic log

Appendix C - Exploratory logs

Appendix D - Infiltration testing certificates

Figures



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HP3 9RT
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Client

BLUE CEDAR HOMES LIMITED

Project Title

CASTLE STREET, DEBBINGTON

Drawing Title

SITE LOCATION MAP

Rev	Drawn	Date	Checked	Date	Approved	Date
00	ASC	21.12.18	AD	21.12.18	KF	21.12.18
Dimensions		Scale		Original Size		
m		1:50,000		A4		

Project Number

314228 - R02 (00)

Drawing File

314228 - SLP.dwg

Drawing Number

FIGURE 1



LEGEND

- Site Boundary
- Trial Pit Location

Rev.	Date	Amendment	Drawn	Chkd.	Appd.



18 Frogmore Road
 Hemel Hempstead
 Hertfordshire
 HP3 9RT
 United Kingdom

Tel: +44 (0) 1442 437500
 Fax: +44 (0) 1442 437550
 Email: info@rsk.co.uk
 Web: www.rsk.co.uk

Client
BLUE CEDAR HOMES LIMITED

Project Title
CASTLE STREET, DEBBINGTON

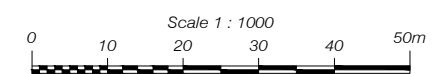
Drawing Title
EXPLORATORY HOLE LOCATION PLAN

Drawn	Date	Checked	Date	Approved	Date
ASC	21.12.18	AD	21.12.18	KF	21.12.18

Scale	Orig Size	Dimensions
1:1000	A3	m

Project No.	Drawing File
314228 - R02 (00)	314228 (R02-00) Fig 2.dwg

Drawing No.	Rev.
FIGURE 2	P1





Appendix A – Service constraints

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Blue Cedar Homes Limited (the "client") in accordance with the terms of a contract between RSK and the "client", dated 23 April 2018. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.


Appendix B – Photographic log

Photo no. 1	Date: 04/12/18	
Description: View showing the full depth of TP1 with limestone gravel at the base.		

Photo no. 2	Date: 04/12/18	
Description: View showing the arisings from TP1.		

Photo no. 3	Date: 04/12/18	
Description: View showing the full extent of TP2 with limestone gravel at the base.		

Photo no. 4	Date: 04/12/18	
Description: View showing the arisings from TP2.		

Photo no. 5	Date: 04/12/18	
Description: View showing the full extent of TP3 with limestone gravel at the base.		



Appendix C – Exploratory logs

Contract: Castle Street, Deddington		Client: Blue Cedar Homes Ltd		Trial Pit: TP1
Contract Ref: Castle Street, Deddington	Start: 04.12.18	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Turf overlying brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of limestone and quartzite.	(0.30)	
						Orangish brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of ironstone, limestone and quartzite.	(0.60)	
						Strong brownish grey LIMESTONE recovered as gravels and cobbles.	1.05	
Trial pit terminated at 1.05m depth.								

GINT LIBRARY_V8_07.GLB LibVersion: v8_07 | Log TRIAL PIT LOG - A4P | 314228 CASTLE STREET, DEDDINGTON.GPJ - v8_07.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 12/12/18 - 09:35 | CR5 |

Plan (Not to Scale) 	General Remarks		
	All dimensions in metres		Scale: 1:25
Method Used: Hand dug	Plant Used: Hand tools	Logged By: ???	Checked By:

Contract: Castle Street, Deddington		Client: Blue Cedar Homes Ltd		Trial Pit: TP2	
Contract Ref: Castle Street, Deddington	Start: 04.12.18	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1	
End: 04.12.18					

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Turf overlying brown slightly sandy slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse of limestone and quartzite.	(0.30)	
						Orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to coarse of ironstone, limestone and quartzite.	1.00	
						Strong brownish grey LIMESTONE recovered as clayey gravels, cobbles and boulders.	(0.30)	
						Trial pit terminated at 1.60m depth.	1.60	

GINT LIBRARY_V8_07.GLB LibVersion: v8_07 | Log TRIAL PIT LOG - A4P | 314228 CASTLE STREET, DEDDINGTON.GPJ - v8_07.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 12/12/18 - 09:35 | CR5 |

Plan (Not to Scale)		General Remarks			
		1. Hard digging from 1.00m depth.			
		All dimensions in metres		Scale: 1:25	
Method Used: Hand dug		Plant Used: Hand tools		Logged By: ???	
				Checked By: ???	

Contract: Castle Street, Deddington		Client: Blue Cedar Homes Ltd		Trial Pit: TP3	
Contract Ref: Castle Street, Deddington	Start: 04.12.18	Ground Level: ---	Co-ordinates: ---	Sheet: 1 of 1	
End: 04.12.18					

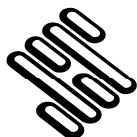
Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						Turf overlying brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to coarse of limestone and quartzite.	(0.30)	
						Orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to coarse of ironstone, limestone and quartzite. ... at 0.70m becoming very gravelly. ... from 0.80m hard digging.	(1.10)	
						Strong brownish grey LIMESTONE recovered as clayey gravels, cobbles and boulders.	1.40	
						Trial pit terminated at 1.60m depth.	1.60	

GINT LIBRARY_V8_07.GLB LibVersion: v8_07 | Log TRIAL PIT LOG - A4P | 314228 CASTLE STREET, DEDDINGTON.GPJ - v8_07.
 RSK Environment Ltd, The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117 947 1006 Fax: 0117 947 1009 Web: www.rsk.co.uk | 12/12/18 - 09:35 | CR5 |

Plan (Not to Scale)		General Remarks			
		All dimensions in metres		Scale: 1:25	
Method Used: Hand dug	Plant Used: Hand tools	Logged By: ???	Checked By:		



Appendix D – Infiltration test certificates



STRUCTURAL SOILS LTD
INSITU TESTING REPORT



1774

Report No. 748564R.01(00)

Date 06-December-2018 Contract Castle Street, Deddington

Client RSK Environment Ltd
Address Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR

For the Attention of Romani Salama

Order received	03-December-2018	Client Reference	None
Testing Started	04-December-2018	Client Order No.	None
Testing Completed	04-December-2018	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

Not UKAS Accredited Tests

3no. Soakaway tests carried out at locations specified by client.

The results represent the ground conditions at the specified locations and depths at the time of testing.

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

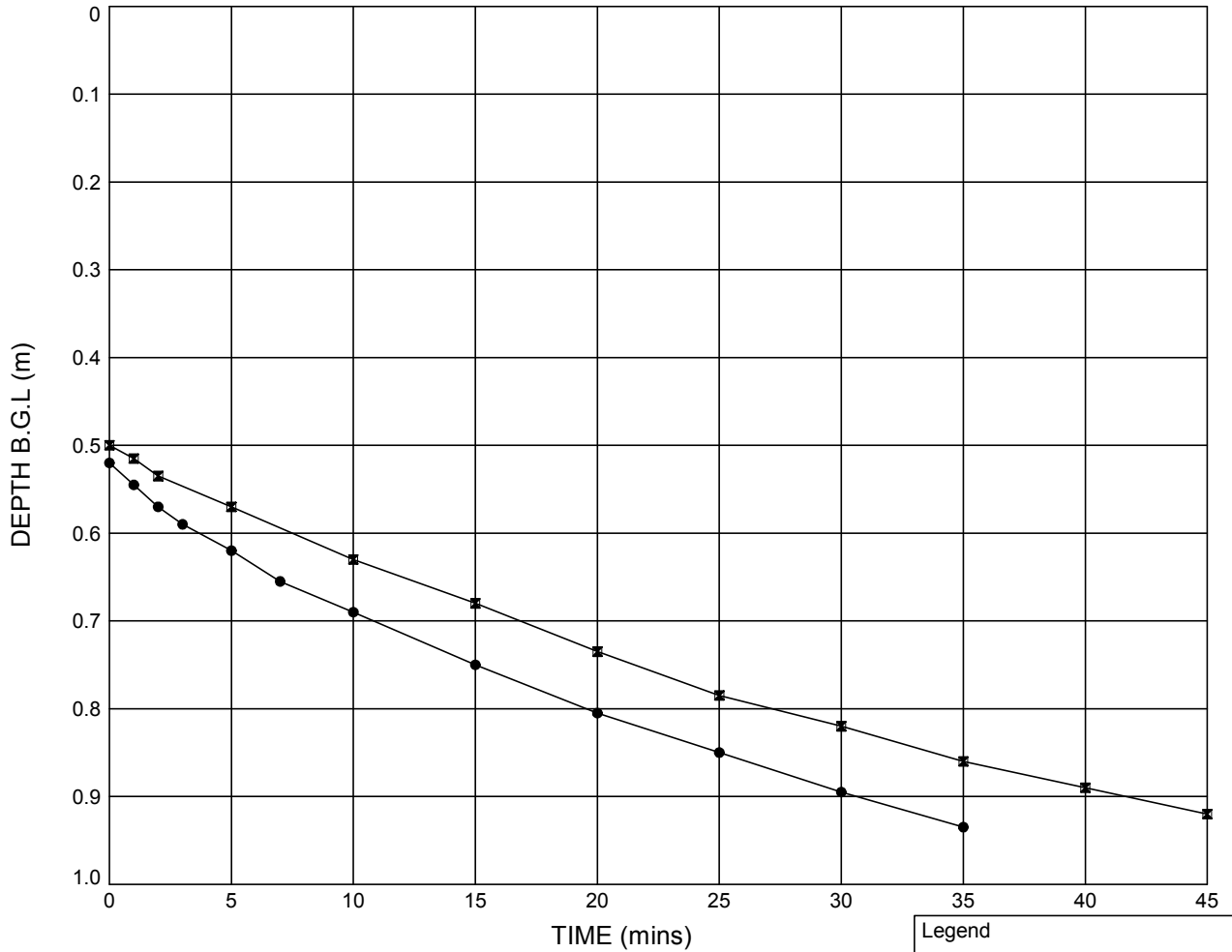
Structural Soils Ltd 1a Princess Street Bedminster Bristol BS3 4AG Tel.0117 9471000. e-mail dimitris.xirouchakis@soils.co.uk

FULL SCALE SOAKAWAY TEST

Non-standard test

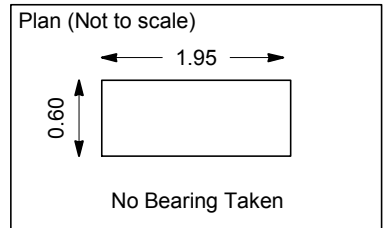
Soakaway Test - Position ID : TP1

Plot of Depth of Water Below Ground Level Against Time

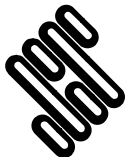


	Test 1	Test 2	
Pit start depth:	= 1.05	1.05	m
Pit final depth:	= 1.05	1.04	m
Effective depth, D_e	= 0.53	0.54	m
Effective storage volume, V_{p75-25}	= 0.3101	0.3159	m^3
Surface area, a_{p50}	= 2.5215	2.5470	m^2
Time, t_{p75-25}	= 1558	1920	secs
Infiltration rate, f	= 7.89×10^{-5}	6.46×10^{-5}	m/s

Legend		
●	Test 1	(04.12.18)
■	Test 2	(04.12.18)



GINT_LIBRARY_v8_07_GLB.LibVersion: v8_07_001 PjVersion: v8_07 | Graph 1 - TP SOAKAWAY - 2 - FINAL REPORT - A4P | 748564.GPJ - v8_07 | 06/12/18 - 09:11 | EH7 |



STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By

Date

Checked By

Date

06/12/18

07/12/18

Contract

Castle Street, Deddington

Contract Ref:

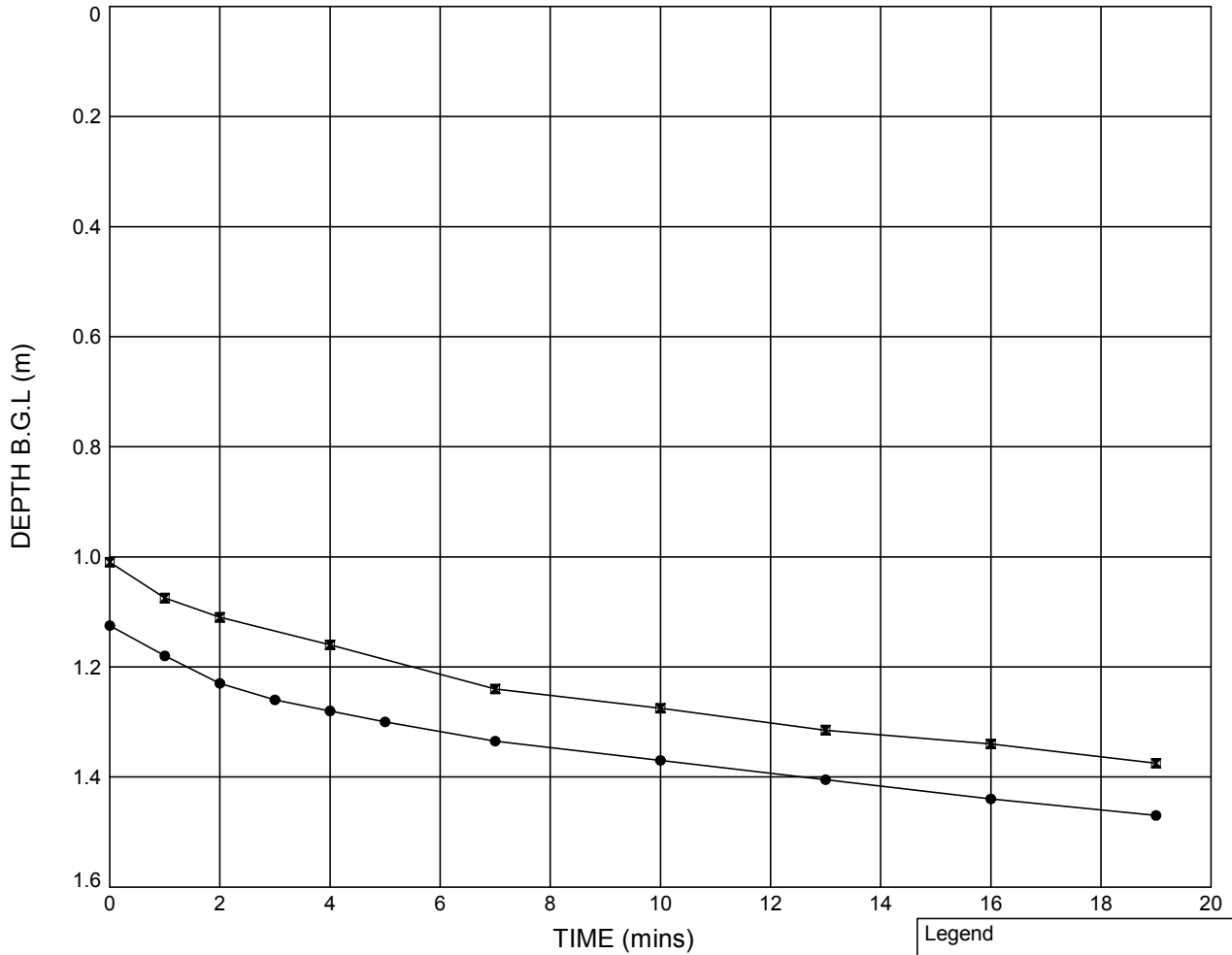
748564

FULL SCALE SOAKAWAY TEST

Non-standard test

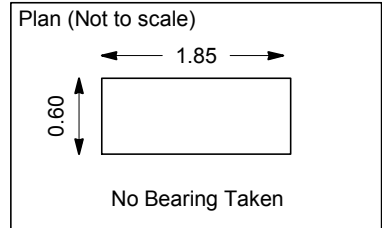
Soakaway Test - Position ID : TP2

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME

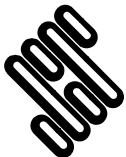


	Test 1	Test 2	
Pit start depth:	= 1.58	1.58	m
Pit final depth:	= 1.57	1.48	m
Effective depth, D_e	= 0.45	0.47	m
Effective storage volume, V_{p75-25}	= 0.2470	0.2609	m ³
Surface area, a_{p50}	= 2.2003	2.2615	m ²
Time, t_{p75-25}	= 940	914	secs
Infiltration rate, f	= 1.19×10^{-4}	1.26×10^{-4}	m/s

Legend		
●	Test 1	(04.12.18)
■	Test 2	(04.12.18)



GINT_LIBRARY_v8_07_GLB.LibVersion: v8_07_001 PjVersion: v8_07 | Graph 1 - TP SOAKAWAY - 2 - FINAL REPORT - A4P | 748564.GPJ - v8_07 | 06/12/18 - 09:12 | EH7 |



STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

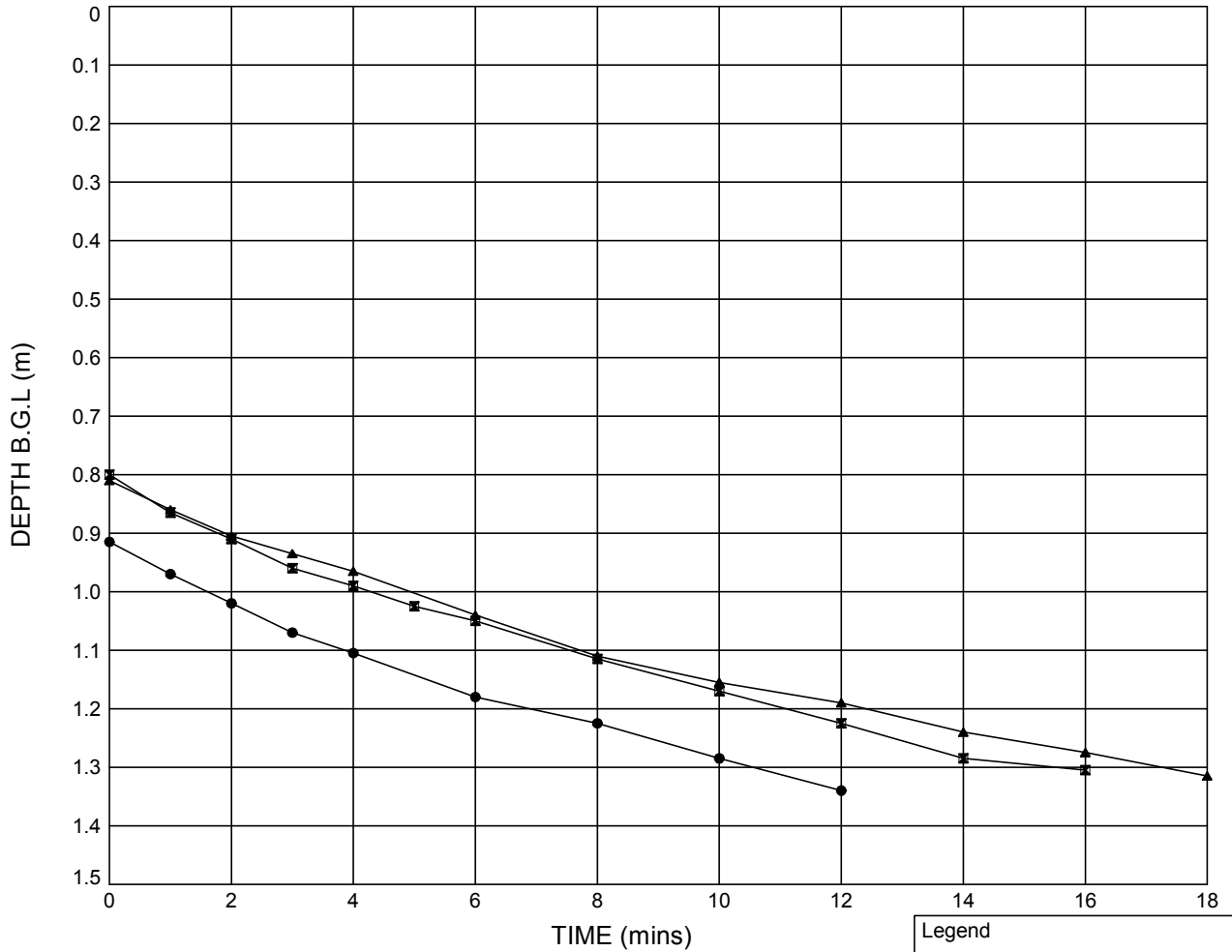
Compiled By	Date	Checked By	Date
<i>[Signature]</i>	06/12/18	<i>[Signature]</i>	07/12/18
Contract		Contract Ref:	
Castle Street, Deddington		748564	

FULL SCALE SOAKAWAY TEST

In accordance with BRE Digest 365

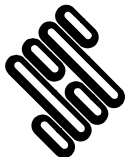
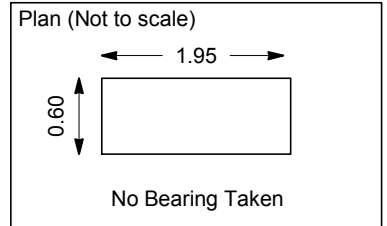
Soakaway Test - Position ID : TP3

Plot of Depth of Water Below Ground Level Against Time



	Test 1	Test 2	Test 3	
Pit start depth:	= 1.46	1.46	1.42	m
Pit final depth:	= 1.46	1.42	1.41	m
Effective depth, D_e	= 0.55	0.62	0.60	m
Effective storage volume, V_{p75-25}	= 0.3188	0.3627	0.3510	m^3
Surface area, a_{p50}	= 2.5598	2.7510	2.7000	m^2
Time, t_{p75-25}	= 527	626	679	secs
Infiltration rate, f	= 2.36×10^{-4}	2.11×10^{-4}	1.91×10^{-4}	m/s

Legend		
●	Test 1	(04.12.18)
■	Test 2	(04.12.18)
▲	Test 3	(04.12.18)



STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By

Date

Checked By

Date

06/12/18

07/12/18

Contract

Castle Street, Deddington

Contract Ref:

748564