

Report on Soakaway Testing

Location:	Midlake House, Gresford.		
For:	Bek Enviro		
Report No.	GES 1604-21	Report date:	September 2021

For and on behalf of **Borehole Solutions Ltd**

	
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1. Introduction

Borehole Solutions Ltd conducted site investigation works at the above-mentioned site. The site location and exploratory hole plan is displayed in Appendix 1. The investigation was undertaken on the 8th of September 2021 in accordance with your instruction to proceed. This report describes the work undertaken, presents the data obtained and discusses the results of the tests.

2. Limitations

This report has been prepared in accordance with our understanding of current best practice. However, new information or legislation, or changes to best practice may necessitate revision of the report after the date of issue. No liability can be accepted for the incorrect interpretation of any of the factual data supplied, particularly between investigatory locations.

3. Fieldworks

The programme of this investigation included the proposed excavation of two (2no.) trial pits with subsequent soakaway testing.

During this work, the soils encountered were logged in general accordance with BS 5930: 1990, as amended in 2007, and full descriptions are given on the borehole records, which are displayed in Appendix 2.

4. Strata Conditions

The succession has been shown to include the following:

Table 1: Generalised Strata Profile			
Maximum Depth m below ground level to underside of layer	Strata Type	Positions Layer	Groundwater Strikes m below ground level
0.5	TOPSOIL	All Excavated Locations	None
1.2	Orange brown silty sandy GRAVEL	All Excavated Locations	None

'+' denotes that the strata extended below the termination depth of the investigated positions, thus the extent of the deposit is only proven to the depths indicated.

5. Testing - Geotechnical

During the soakaway test the water should achieve a fall from 75% to 25% of the effective depth of the storage volume. The results obtained from the soakaway tests are summarised below:

Table 3: Soakaway Test Results

Hole ID	Soakage Area Dimensions (m)	Depth (m)	Soil Description (Base of TP)	Infiltration Rate (m/sec)	Drainage Characteristics
TP01 Test 1	1.40 x 0.60	1.30	Orange brown silty sandy GRAVEL	6.4×10^{-5}	Good
TP01 Test 2	1.40 x 0.60	1.50	Orange brown silty sandy GRAVEL	6.6×10^{-5}	Good
TP01 Test 3	1.40 x 0.60	1.50	Orange brown silty sandy GRAVEL	6.4×10^{-5}	Good
TP02 Test 1	1.50 x 0.60	1.30	Orange brown silty sandy GRAVEL	1.2×10^{-4}	Good
TP02 Test 2	1.50 x 0.60	1.50	Orange brown silty sandy GRAVEL	1.2×10^{-4}	Good
TP02 Test 3	1.50 x 0.60	1.50	Orange brown silty sandy GRAVEL	6.9×10^{-5}	Good

The full soakaway tests results are displayed in Appendix 3.

6. Discussion

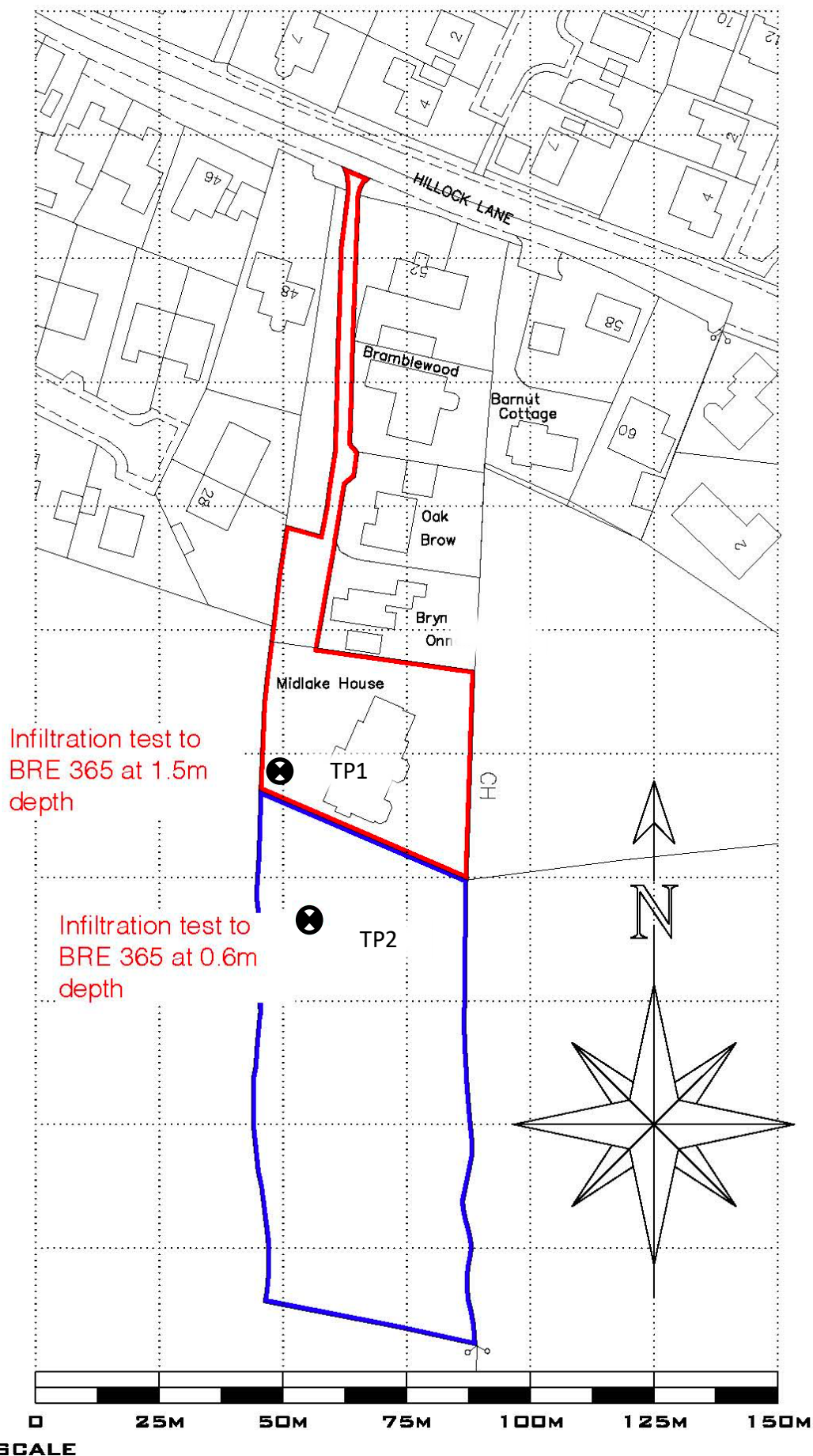
The natural soils encountered in TP1 and TP2 were found to be sandy gravels. The soakaway tests at both positions achieved a drop between and 25% and 75% of the storage volume of the pit in around 30 mins, which would indicate good infiltration properties.

7. References

- British Standards Institution (1990) BS1377: *British standard methods of test for soils for civil engineering purposes*, B.S.I., London.
- British Standards Institution (2015) BS5930: *Code of practice for site investigations*, B.S.I., London.

Appendix 1

Site Location and Exploratory Hole Plan



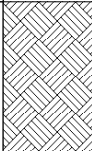
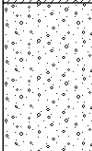
Title: **Investigation Location Plan**

Appendix 2

Exploratory Hole Records

Trial Pit Log

Project Name: Midlake House		Client: BEK Environmental		Date: 08/09/2021	
Location: Midlake House, Gresford		Contractor:			
Project No. : 1604-21		Crew Name:		Equipment:	
Location Number TP01	Location Type TP	Level	Logged By RL	Scale 1:25	Page Number Sheet 1 of 1

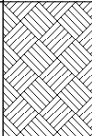
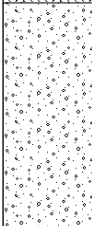
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50			TOPSOIL: Orange brown silty sandy slightly clayey GRAVEL: Gravel is fine to coarse sub-angular to sub-rounded of mixed lithology.	
					1.00			Orange brown silty sandy GRAVEL: Gravel is fine to coarse sub-angular to sub-rounded of mixed lithology.	
								End of Borehole at 1.000m	1
									2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.40	0.60						

Remarks Test undertaken at 1.0mbgl. Target depth 0.65mbgl- Topsoil to 0.5mbgl therefore pit extended.							
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Trial Pit Log

Project Name: Midlake House		Client: BEK Environmental		Date: 08/09/2021	
Location: Midlake House, Gresford		Contractor:			
Project No. : 1604-21		Crew Name:		Equipment:	
Location Number TP02	Location Type TP	Level	Logged By RL	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					
					0.45			TOPSOIL: Orange brown silty sandy slightly clayey GRAVEL: Gravel is fine to coarse sub-angular to sub-rounded of mixed lithology.	
					1.20			Orange brown silty sandy GRAVEL: Gravel is fine to coarse sub-angular to sub-rounded of mixed lithology.	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
1.40	0.60						

Remarks Pit Collapsing due to granular deposits- Target depth 1.5. Test undertaken at 1.20mbgl depth.							
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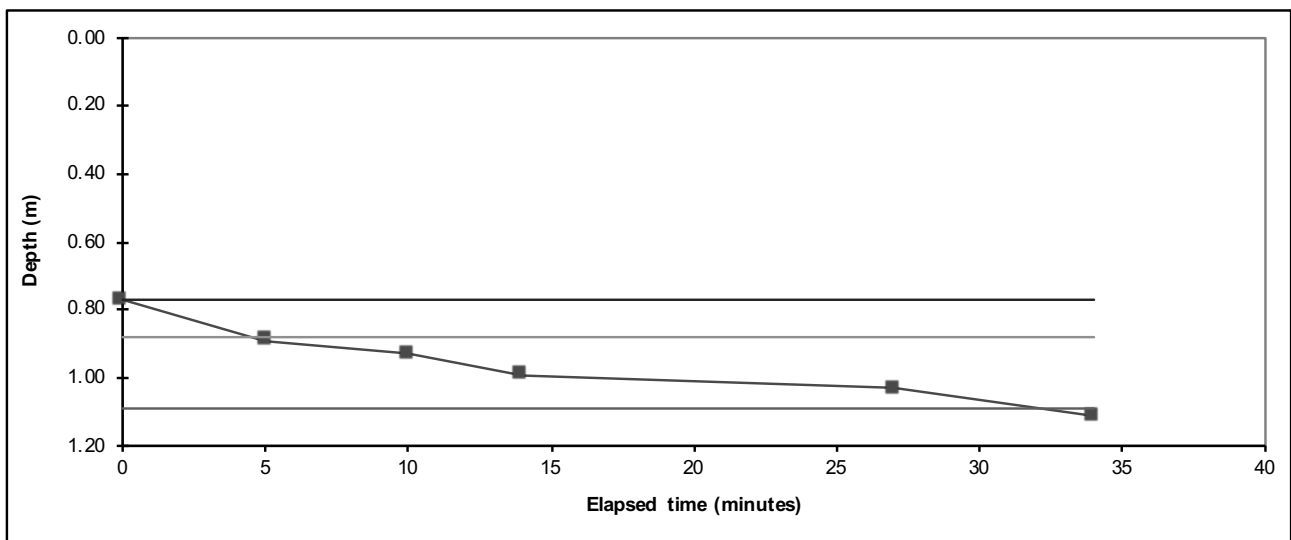
Appendix 3

Soakaway Testing Results

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Soakaway Test

Trial Pit No:	TP1	Test No:	1	Date:	08/09/2021
Length (m):	1.400	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.20	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.770			
	5	0.890			
	10	0.930			
	14	0.990			
	27	1.030			
	34	1.112			



Start water depth for analysis (mbgl):	0.77		
75% effective depth (mbgl):	0.88	Elapsed time (mins):	4.6
50% effective depth (mbgl):	0.99		
25% effective depth (mbgl):	1.09	Elapsed time (mins):	32.1
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m ³):			0.176
Mean surface area of outflow (m ²):			1.68
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			27.5

Soil infiltration rate (m/s):	6.4E-5
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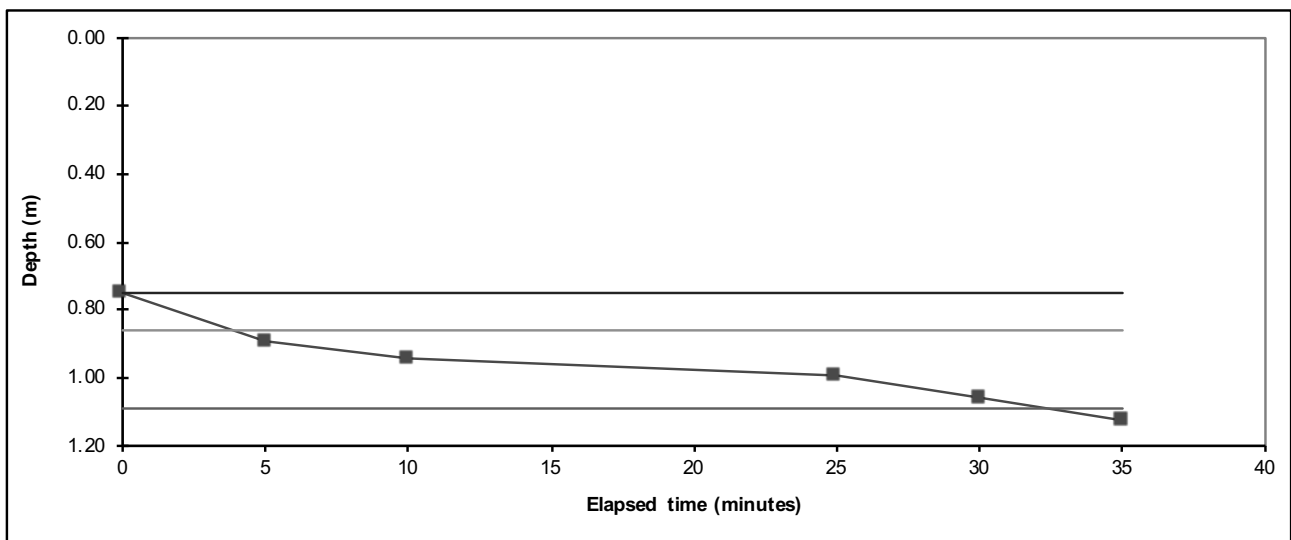
Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP1
Site:	Midlake House	

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Soakaway Test

Trial Pit No:	TP1	Test No:	2	Date:	08/09/2021
Length (m):	1.400	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.20	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.750			
	5	0.895			
	10	0.945			
	25	0.995			
	30	1.060			
	35	1.125			



Start water depth for analysis (mbgl):	0.75		
75% effective depth (mbgl):	0.86	Elapsed time (mins):	3.8
50% effective depth (mbgl):	0.98		
25% effective depth (mbgl):	1.09	Elapsed time (mins):	32.3
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m ³):			0.193
Mean surface area of outflow (m ²):			1.72
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			28.5

Soil infiltration rate (m/s):	6.6E-5
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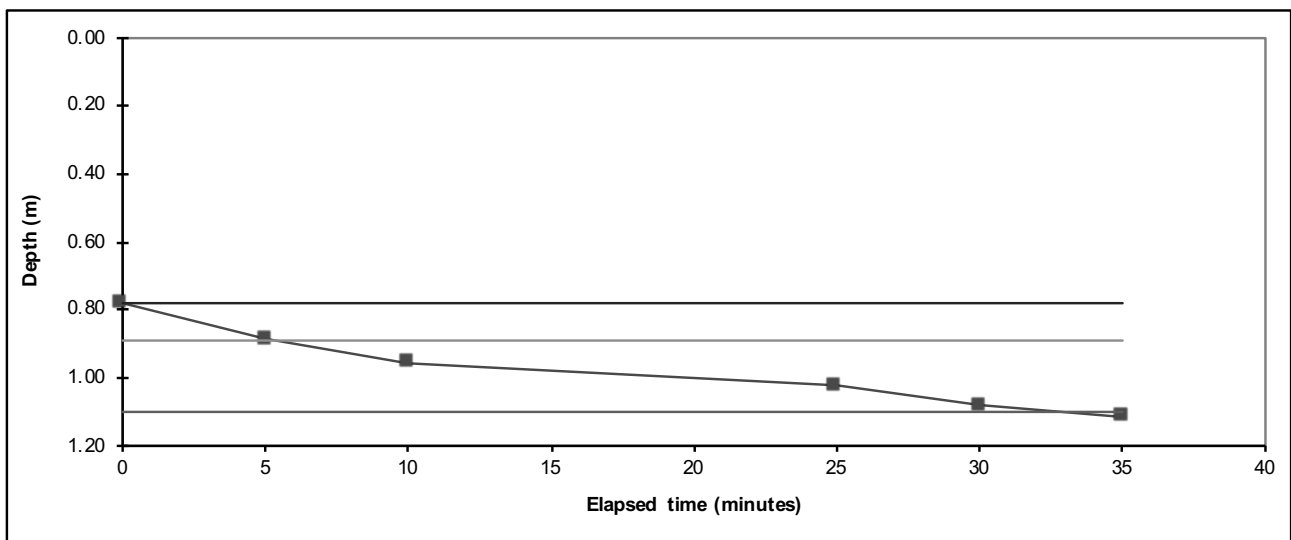
Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP1
Site:	Midlake House	

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Soakaway Test

Trial Pit No:	TP1	Test No:	3	Date:	08/09/2021
Length (m):	1.400	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.20	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.780			
	5	0.885			
	10	0.955			
	25	1.025			
	30	1.080			
	35	1.115			



Start water depth for analysis (mbgl):	0.78		
75% effective depth (mbgl):	0.89	Elapsed time (mins):	5.4
50% effective depth (mbgl):	0.99		
25% effective depth (mbgl):	1.10	Elapsed time (mins):	32.9
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m ³):			0.176
Mean surface area of outflow (m ²):			1.68
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			27.5

Soil infiltration rate (m/s):	6.4E-5
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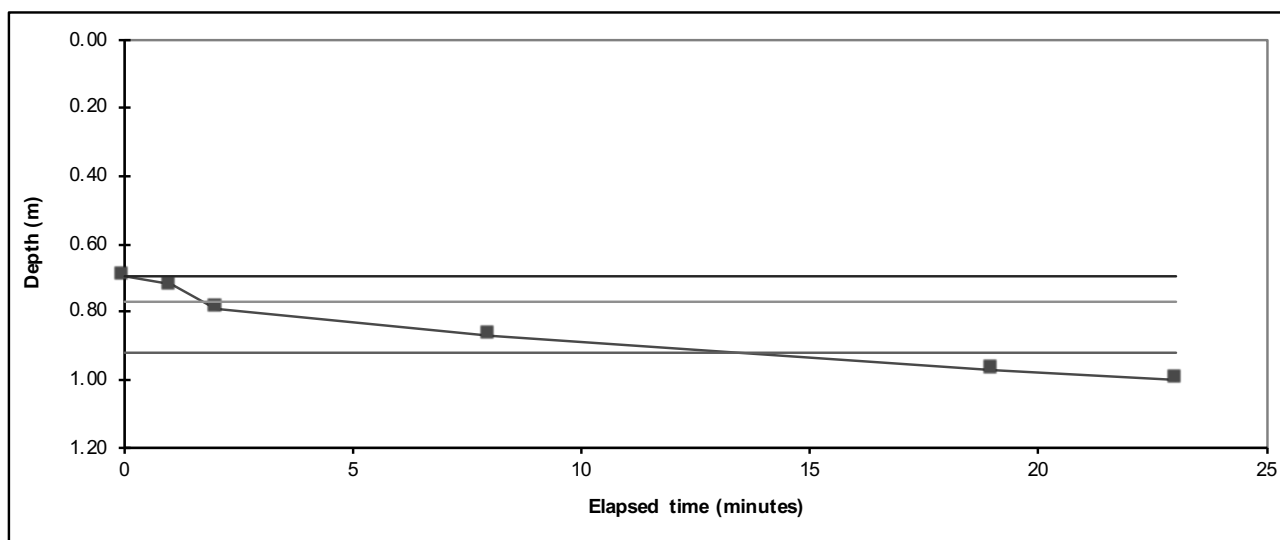
Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP1
Site:	Midlake House	

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Soakaway Test

Trial Pit No:	TP2	Test No:	2	Date:	08/09/2021
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.00	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.695			
	1	0.720			
	2	0.790			
	8	0.870			
	19	0.970			
	23	1.000			



Start water depth for analysis (mbgl):	0.70		
75% effective depth (mbgl):	0.77	Elapsed time (mins):	1.7
50% effective depth (mbgl):	0.85		
25% effective depth (mbgl):	0.92	Elapsed time (mins):	13.5
Base of soakage zone (mbgl):	1.00		
Volume outflow between 75% and 25% effective depth (m ³):			0.135
Mean surface area of outflow (m ²):			1.53
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			11.8

Soil infiltration rate (m/s):	1.2E-4
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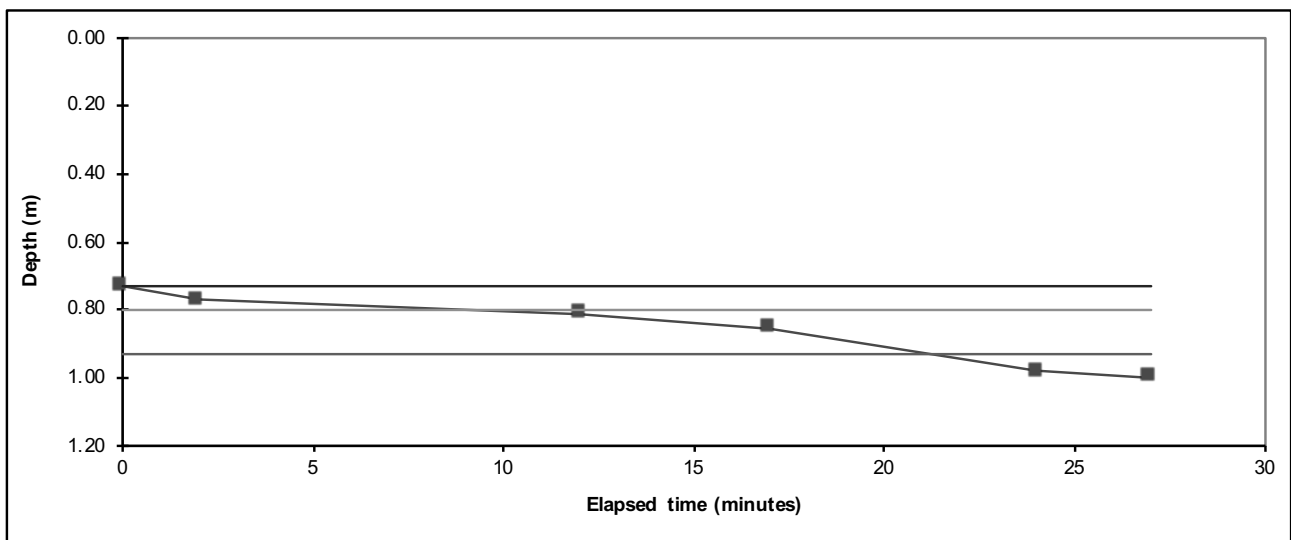
Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP2
Site:	Midlake House	

Borehole Solutions

Soakaway Test

Trial Pit No:	TP2	Test No:	2	Date:	08/09/2021
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.00	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.730			
	2	0.770			
	12	0.810			
	17	0.855			
	24	0.980			
	27	1.000			



Start water depth for analysis (mbgl):	0.73		
75% effective depth (mbgl):	0.80	Elapsed time (mins):	9.5
50% effective depth (mbgl):	0.87		
25% effective depth (mbgl):	0.93	Elapsed time (mins):	21.2
Base of soakage zone (mbgl):	1.00		
Volume outflow between 75% and 25% effective depth (m ³):			0.117
Mean surface area of outflow (m ²):			1.45
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			11.7

Soil infiltration rate (m/s):	1.2E-4
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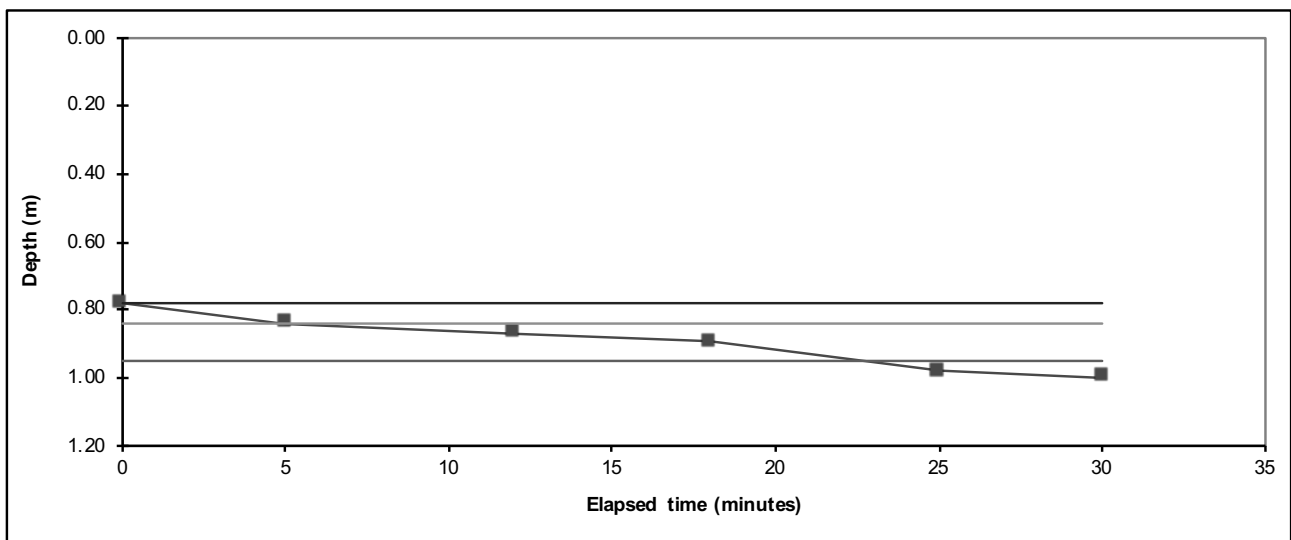
Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP2
Site:	Midlake House	

Borehole Solutions

Soakaway Test

Trial Pit No:	TP2	Test No:	3	Date:	08/09/2021
Length (m):	1.500	Datum Height:			0.00 m agl
Width (m):	0.60	Granular infill:	None		
Depth (m):	1.00	Porosity of infill:	1	(assumed)	
	Elapsed time (minutes)	Water Depth (m below datum)	Elapsed time (minutes)	Water Depth (m below datum)	
	0	0.780			
	5	0.840			
	12	0.870			
	18	0.895			
	25	0.980			
	30	1.000			



Start water depth for analysis (mbgl):	0.78		
75% effective depth (mbgl):	0.84	Elapsed time (mins):	5.0
50% effective depth (mbgl):	0.89		
25% effective depth (mbgl):	0.95	Elapsed time (mins):	22.5
Base of soakage zone (mbgl):	1.00		
Volume outflow between 75% and 25% effective depth (m ³):			0.099
Mean surface area of outflow (m ²):			1.36
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			17.5

Soil infiltration rate (m/s):	6.9E-5
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Remarks	Results processed following BRE 365 (2007).
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Client:	BEK Enviro	TP2
Site:	Midlake House	