Environmental
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SOAKAWAY
LETTER
REPORT

job number	C5760/26/E/8947
date	10.02.26
site address	Kingsley Avenue Crosland Moor Huddersfield HD1 3SR
written by	S. Hale
checked by	R. Palmer
issued by	S. Hale

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Contents

Appendices

Report on Soakaway Testing

Location:	Kingsley Avenue Crosland Moor, Huddersfield, West Yorkshire, HD1 3SR		
For:	Mr Ali		
Consultants:	Acumen Designers & Architects		
Report No.	C5760/26/E/8947	Report Date:	February 2026

For and on behalf of **Rogers Geotechnical Services Ltd**

Steven Hale BSc FGS Geo-environmental Engineer	**Rob Palmer** MSc FGS ACIEH Engineering Director

Report Summary[1]

Item	Comments	Section
Geology	Soft Bed Flags and Pennine Lower Coal Measures Formation.	4.
Strata Conditions	Topsoil overlying cohesive material representing the weathered Pennine Lower Coal Measures Formation.	5.
Groundwater	None encountered.	5.
Suitability of Soakaways	Not recommended within TP01 and TP03, could be adopted given suitable design and considerations within TP02.	7.

[1] This summary should not be relied upon to provide a comprehensive review. All of the information contained in this document should be considered.

1. Introduction

We thank you for your request to undertake percolation testing at the above-mentioned site and take pleasure in enclosing the results of this work. The investigation was undertaken on the 6th February 2026 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

The recommendations made and opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between trial pit positions, these are for guidance only and no liability can be accepted for their accuracy.

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.

3. Fieldworks

It should be appreciated that due to site constraints, it was not possible to access the test locations with mechanical plant. As a result, hand-dug trial pits were excavated in order to undertake the soakaway testing, the positions of which are shown in Appendix 1. It should be noted that the locations were specified by the consultant. The soakaway tests were undertaken at the base of the pit at depths rational to the construction of soakaways. The soils exposed in the trial pits were logged on site in general accordance with BS5930: 2015 +A1: 2020, and full descriptions are given on the trial pit records which are presented in Appendix 2. Photographs of the trial pits are included within Appendix 3.

Once excavations were completed, the trial pits were carefully re-instated with the arisings. Whilst every care was taken during the infilling process, including compacting of the infill at regular intervals, it should be appreciated that some mounding of the surface may have resulted. Moreover, the infilled soils may be subjected to settlement over time, such that a depression in the surface may also occur. Therefore, the locations of any pits undertaken in this investigation should be conveyed to the current site user, as the mounds or depressions associated with the pits may present a risk to current site operations.

4. Geology

The available published geological data for the site has been examined and the following table presents the anticipated geology.

Table 1: Geological Data for the Site

Strata Type	Strata Name[2]	Parent Unit[3]	Description[3]
Superficial Geology	-	-	None indicated beneath the site.
Solid Geology	Soft Bed Flags	Pennine Lower Coal Measures Formation	The Soft Bed Flags are generally fine-grained, thinly-bedded and cross-bedded to flaggy sandstone interbedded with mudstone.
	Pennine Lower Coal Measures Formation	Pennine Coal Measures Group	Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.

It should be appreciated that the site is sloping in nature. With reference to the geological map, the crest of the slope forms the lithological boundary between the Soft Bed Flags, a named sandstone member, and undifferentiated strata of the Pennine Lower Coal Measures Formation. Indeed, the plateau at the top of the slope where Kingsley Avenue is situated is underlain by the Soft Bed Flags. However, the site itself is likely to be underlain by mudstone and siltstone which over time will have been more susceptible to weathering, thus resulting in the sloped nature of the site.

5. Strata Conditions

In accordance with the geology of the area, the succession has been shown to include the following:

Table 2: Generalised Strata Profile

Depth m below ground level to underside of layer	**Strata Type**	**Positions Layer Revealed**	**Groundwater Strikes** m below ground level
0.20	TOPSOIL (Dark brown, organic. sandy, silty CLAY)	All	None
+1.20	WEATHERED PENNINE LOWER COAL MEASURES FORMATION Soft to firm and firm, greyish brown, slightly gravelly, silty CLAY	TP01 & TP03	None
+1.00	WEATHERED PENNINE LOWER COAL MEASURES FORMATION Firm, friable, greyish brown, slightly sandy, gravelly, silty CLAY	TP02	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.

It should be noted that the soils recorded at TP02 were notably more sandy and contained more gravel than the soils exposed at TP01 and TP03.

[2] Sources: British Geological Survey (NERC) Map Sheets 77; Huddersfield; Solid and Drift Edition, and GeoIndex Onshore Viewer [*online resource from www.bgs.ac.uk*]
[3] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

6. Insitu Testing

6.1 Soakaway Test

On reaching the elected soakaway test depth, the pit was trimmed and squared as much as practicable. Water was then introduced into the pit at a controlled rate and the level monitored at time intervals relative to a reference bar at ground level. The results obtained from the soakaway tests are presented at Appendix 4 and are summarised below:

Table 3: Soakaway Test Results

Location	Soakage Area Dimensions (average) (m)	Depths of soaked strata (m)	Soil Description (of soaked strata)	Infiltration Rate (m/sec)	*Drainage Characteristics
TP01	0.30 x 0.50	0.75 to 1.20	Side – Slightly gravelly, silty CLAY Base – As above	N/A	Practically impermeable
TP02	0.30 x 0.50	0.55 to 1.00	Side – Slightly sandy, gravelly, silty CLAY Base – As above	1.4×10^{-4} 5.6×10^{-5} 4.3×10^{-5}	Good
TP03	0.30 x 0.50	0.80 to 1.20	Side – Slightly gravelly, silty CLAY Base – As above	N/A	Practically impermeable

*Based on the most onerous results for each test.

During the soakaway tests the water level did not achieve a fall from 75% to 25% of the effective depth of the storage volume in TP01 and TP03. In both tests, negligible movement was noted to the water level movement. On this basis, the tests could not be completed within the scope of the method provided in BRE Digest 365 due to the poor soakage rate of the exposed soils. Due to the negligible water movement it was not possbile to extrapolate the results obtained in order to obtain a soil infiltration rate.

Three tests were completed within TP02, with the water level achieving a fall from 75% to 25% of the effective depth of the storage volume each time.

7. Discussion

The soils encountered beneath the topsoil were found to be typical of the weathered fraction of the underlying Pennine Lower Coal Measures Formation. The strata conditions and subsequent drainage characteristics appear to be comparable between trial pit positions TP01 and TP03. In this instance, the infiltration testing has revealed that the soils have poor drainage characteristics. Strata conditions and drainage characteristics were noted to differ within TP02. Despite apparent cohesive conditions, all tests within TP02 were noted to be successful with ‘good’ infiltration rates. It should be appreciated that while TP01 and TP03 were undertaken directly on top of the undifferentiated Pennine Lower Coal Measures Formation, TP02 was undertaken on the boundary between it and the Soft Bed Flags. This can be seen within the geological site plan presented within Appendix 1. As such, it is considered that this may have had an impact on the drainage characteristics of this location. In conclusion, it is not recommended that soakaways be adopted within the locations of TP01 and TP03. However, soakaways may be considered within the location of TP02 subject to suitable design. Cognisance should be given to the cohesive nature of the local geology and the presence of existing and proposed residential dwellings downslope from the proposed locations.

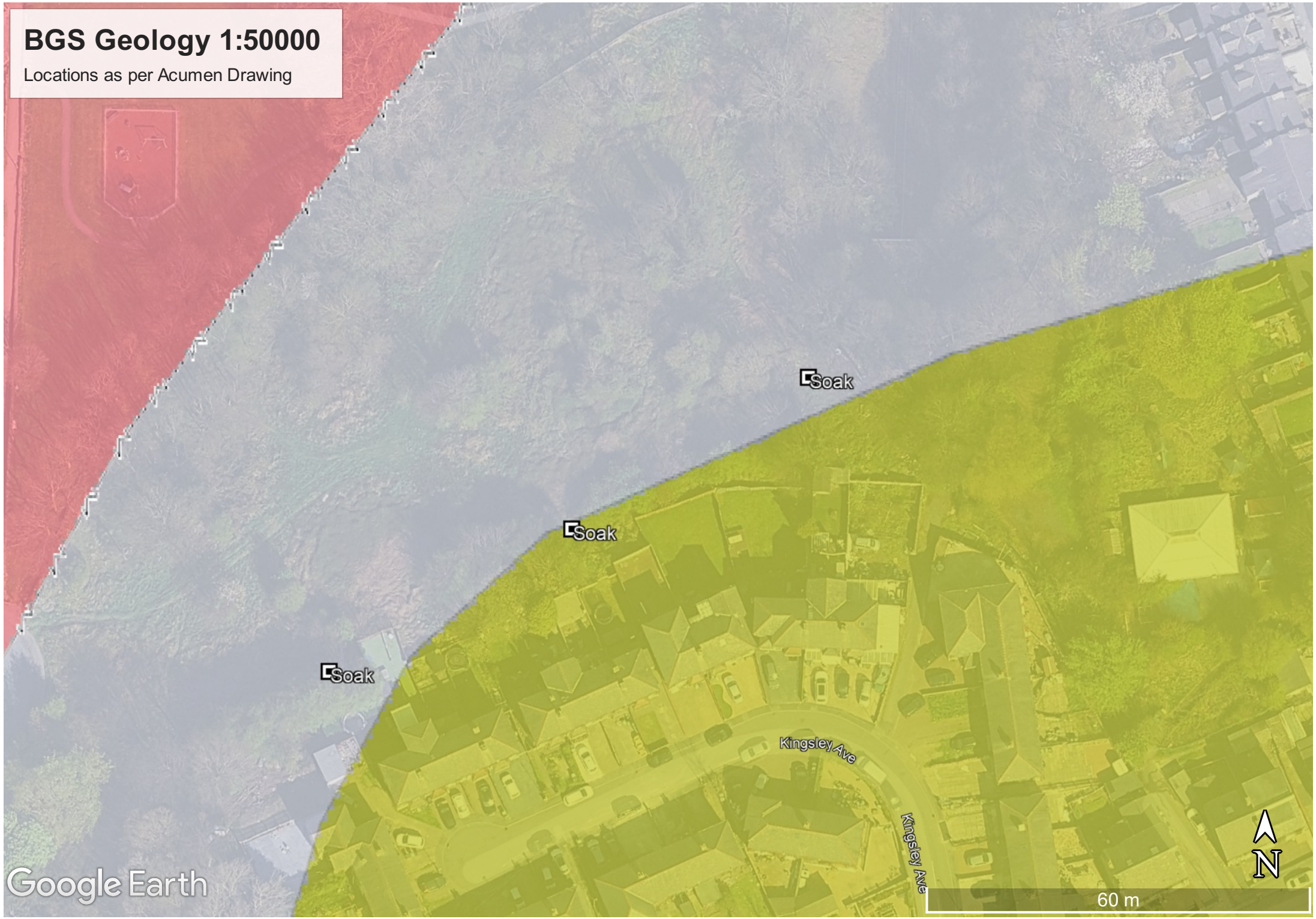
8. References

- Building Research Establishment (BRE) Digest 365, *Soakaway Design*, September 1991.
- British Standards Institution (2015 +A1: 2020) BS 5930: *Code of practice for ground investigations*, B.S.I., London.
- Barnes, G. (2000). *Soil Mechanics Principle and Practice.* 2nd ed. London: Macmillan Press Ltd, p.47.

Appendix 1

Site Plan


TP03
TP02
TP01
Church St
Kingsley Ave
N
70 m
Google Earth


BGS Geology 1:50000
Locations as per Acumen Drawing
Soak
Soak
Soak
Kingsley Ave
Kingsley Ave
N
60 m
Google Earth

Appendix 2

Trial Pit Records

Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

Project Name: Kingsley Avenue	Project No. C5760/26/E/8947	Co-ords: - Level:	Date 06/02/2026
Location: Crosland Moor, Huddersfield HD1 3SR		Dimensions (m): Depth 1.20 — 0.5 × 0.3	Scale 1:25
Client: Mr Ali & Acumen Architects			Logged RP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			TOPSOIL (Dark brown organic sandy silty CLAY).
				1.20			Soft to firm and firm greyish brown slightly gravelly silty CLAY. Gravel is sub-angular and tabular fine to coarse of siltstone and mudstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
							End of pit at 1.20 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

Project Name: Kingsley Avenue	Project No. C5760/26/E/8947	Co-ords: - Level:	Date 06/02/2026
Location: Crosland Moor, Huddersfield HD1 3SR		Dimensions (m): Depth 1.00 — 0.5 × 0.3	Scale 1:25
Client: Mr Ali & Acumen Architects			Logged RP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			TOPSOIL (Dark brown organic sandy silty CLAY).
				1.00			Firm friable greyish brown slightly sandy gravelly silty CLAY. Gravel is sub-angular and tabular fine to coarse of siltstone and sandstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
							End of pit at 1.00 m

Remarks:

Stability:

Trial Pit Log

Trialpit No **TP03**

Sheet 1 of 1

Project Name: Kingsley Avenue	Project No. C5760/26/E/8947	Co-ords: - Level:	Date 06/02/2026
Location: Crosland Moor, Huddersfield HD1 3SR		Dimensions (m): Depth 1.20 — 0.5 × 0.3	Scale 1:25
Client: Mr Ali & Acumen Architects			Logged RP

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			TOPSOIL (Dark brown organic sandy silty CLAY).
				1.20			Soft to firm and firm greyish brown slightly gravelly silty CLAY. Gravel is sub-angular and tabular fine to coarse of siltstone and mudstone. WEATHERED PENNINE LOWER COAL MEASURES FORMATION
							End of pit at 1.20 m

Remarks:

Stability:

Appendix 3

Trial Pit Photographs

TP01

TP03

Rogers Geotechnical Services Ltd

Offices 1 & 2, Barncliffe Business Park,
Near Bank, Shelley,
Huddersfield,

Job No:	Site:	Client:
C5760/26/E/8947	Kingsley Avenue, Crosland Moor	Mr Ali

TP02

TP02 with water

Rogers Geotechnical Services Ltd

Offices 1 & 2, Barncliffe Business Park,
Near Bank, Shelley,
Huddersfield,

Job No: C5760/26/E/8947

Site: Kingsley Avenue, Crosland Moor

Client: Mr Ali

Appendix 4

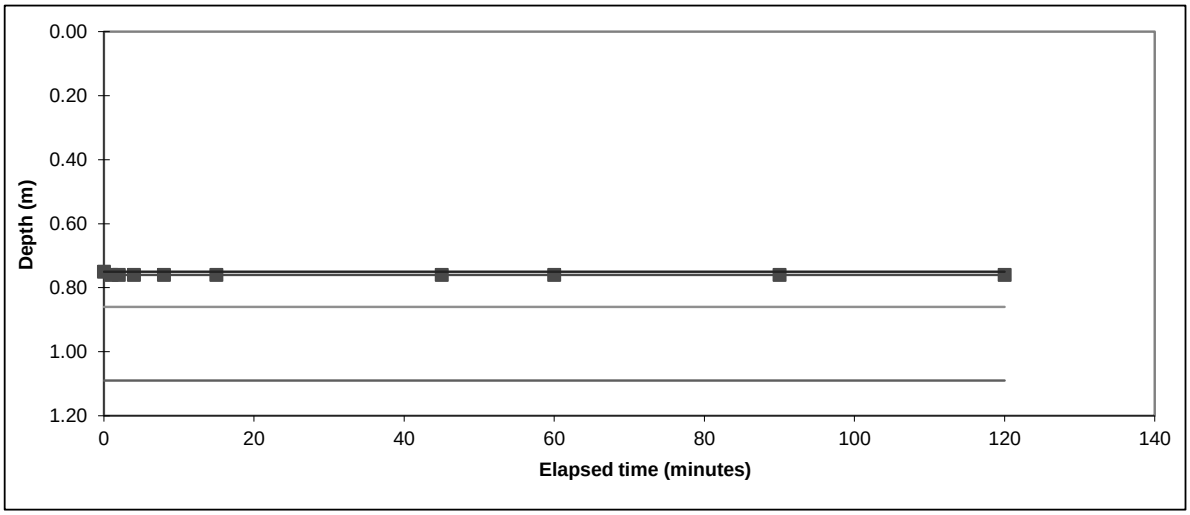
Soakaway Results

Rogers Geotechnical Services L

Soakaway Test

Trial Pit No:	TP01	Test No:	1	Date:	06/02/2026
Length (m):	0.500	Datum Height:		0.00	m agl
Width (m):	0.30	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		
1	0.760		
2	0.760		
4	0.760		
8	0.760		
15	0.760		
45	0.760		
60	0.760		
90	0.760		
120	0.760		



Start water depth for analysis (mbgl):	0.75		
75% effective depth (mbgl):	0.86	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	0.98		
25% effective depth (mbgl):	1.09	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m^3):			
Mean surface area of outflow (m^2):		0.50	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

Soil infiltration rate (m/s):	**Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.**

Remarks Results processed following BRE 365 (2007).

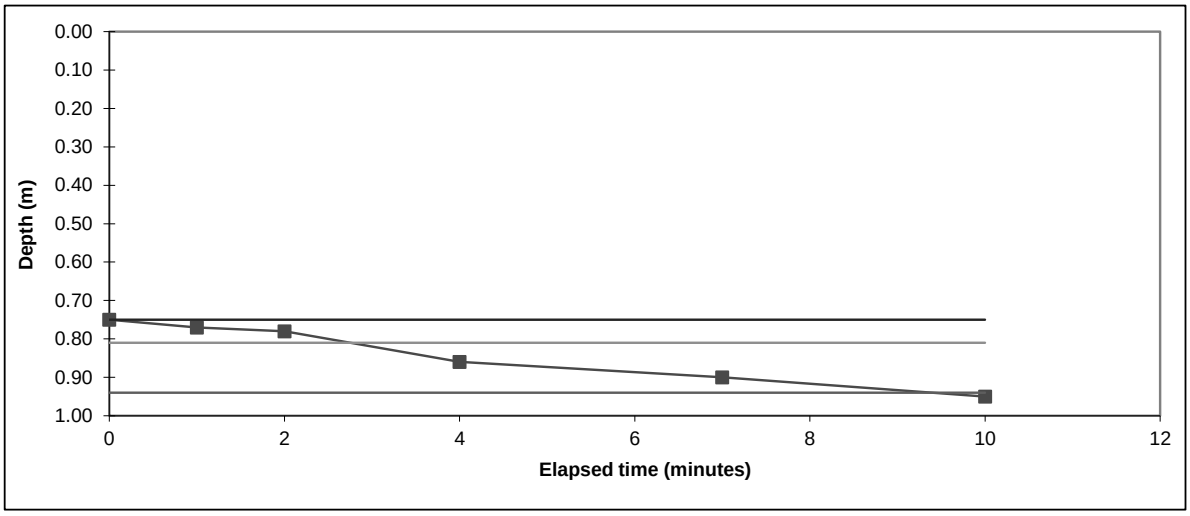
Client:	Mr Ali	**Job No:**
Site:	Kingsley Ave, Crosland Moor	C5760/26/E/8947

Rogers Geotechnical Services L

Soakaway Test

Trial Pit No:	TP02	Test No:	1	Date:	06/02/2026
Length (m):	0.500		Datum Height:	0.00	m agl
Width (m):	0.30		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	0.750		
1	0.770		
2	0.780		
4	0.860		
7	0.900		
10	0.950		



Start water depth for analysis (mbgl):	0.75		
75% effective depth (mbgl):	0.81	Elapsed time (mins):	2.8
50% effective depth (mbgl):	0.88		
25% effective depth (mbgl):	0.94	Elapsed time (mins):	9.4
Base of soakage zone (mbgl):	1.00		

Volume outflow between 75% and 25% effective depth (m^3):	0.020
Mean surface area of outflow (m^2):	0.34
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	6.6

Soil infiltration rate (m/s):	**1.4E-4**

Remarks Results processed following BRE 365 (2007).

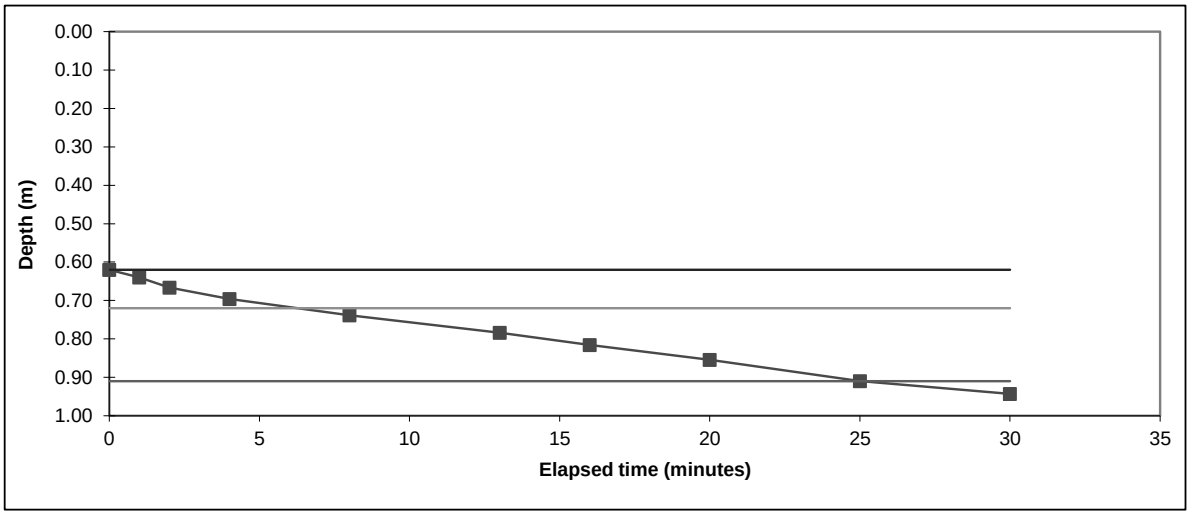
Client:	Mr Ali	**Job No:**
Site:	Kingsley Ave, Crosland Moor	C5760/26/E/8947

Rogers Geotechnical Services L

Soakaway Test

Trial Pit No:	TP02	Test No:	2	Date:	06/02/2026
Length (m):	0.500	Datum Height:		0.00	m agl
Width (m):	0.30	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	0.620		
1	0.640		
2	0.666		
4	0.696		
8	0.738		
13	0.784		
16	0.816		
20	0.854		
25	0.910		
30	0.943		



Start water depth for analysis (mbgl):	0.62		
75% effective depth (mbgl):	0.72	Elapsed time (mins):	6.3
50% effective depth (mbgl):	0.81		
25% effective depth (mbgl):	0.91	Elapsed time (mins):	25.0
Base of soakage zone (mbgl):	1.00		

Volume outflow between 75% and 25% effective depth (m^3):	0.029
Mean surface area of outflow (m^2):	0.45
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	18.7

Soil infiltration rate (m/s):	**5.6E-5**

Remarks Results processed following BRE 365 (2007).

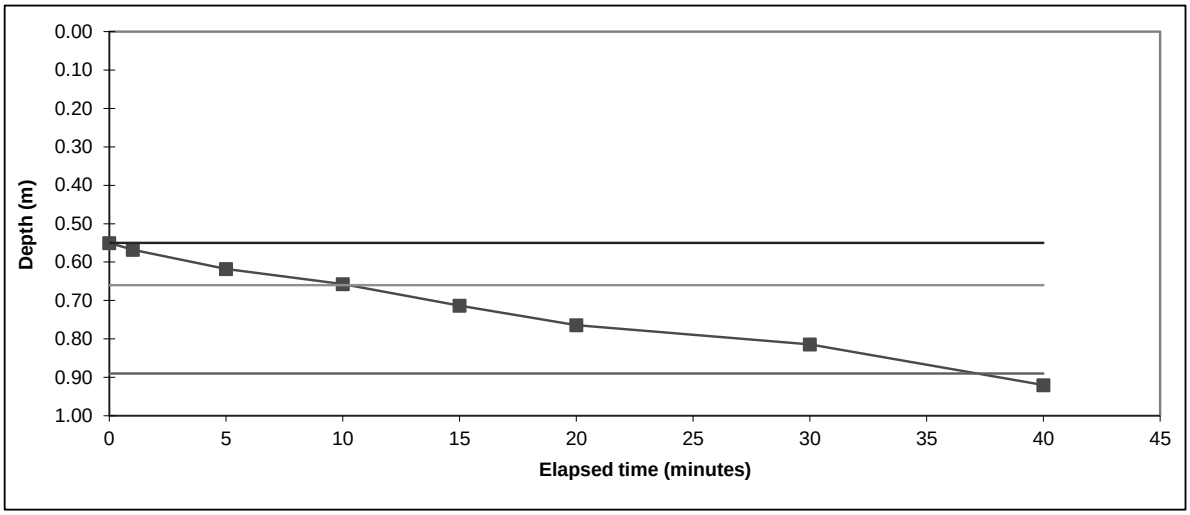
Client:	Mr Ali	**Job No:**
Site:	Kingsley Ave, Crosland Moor	C5760/26/E/8947

Rogers Geotechnical Services L

Soakaway Test

Trial Pit No:	TP02	Test No:	3	Date:	06/02/2026
Length (m):	0.500	Datum Height:		0.00	m agl
Width (m):	0.30	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	0.550		
1	0.568		
5	0.618		
10	0.657		
15	0.713		
20	0.764		
30	0.814		
40	0.920		



Start water depth for analysis (mbgl):	0.55		
75% effective depth (mbgl):	0.66	Elapsed time (mins):	10.3
50% effective depth (mbgl):	0.78		
25% effective depth (mbgl):	0.89	Elapsed time (mins):	37.2
Base of soakage zone (mbgl):	1.00		

Volume outflow between 75% and 25% effective depth (m^3):	0.035
Mean surface area of outflow (m^2):	0.50
(side area at 50% effective depth + base area)	
Time for outflow between 75% and 25% effective depth (mins):	26.9

Soil infiltration rate (m/s):	**4.3E-5**

Remarks Results processed following BRE 365 (2007).

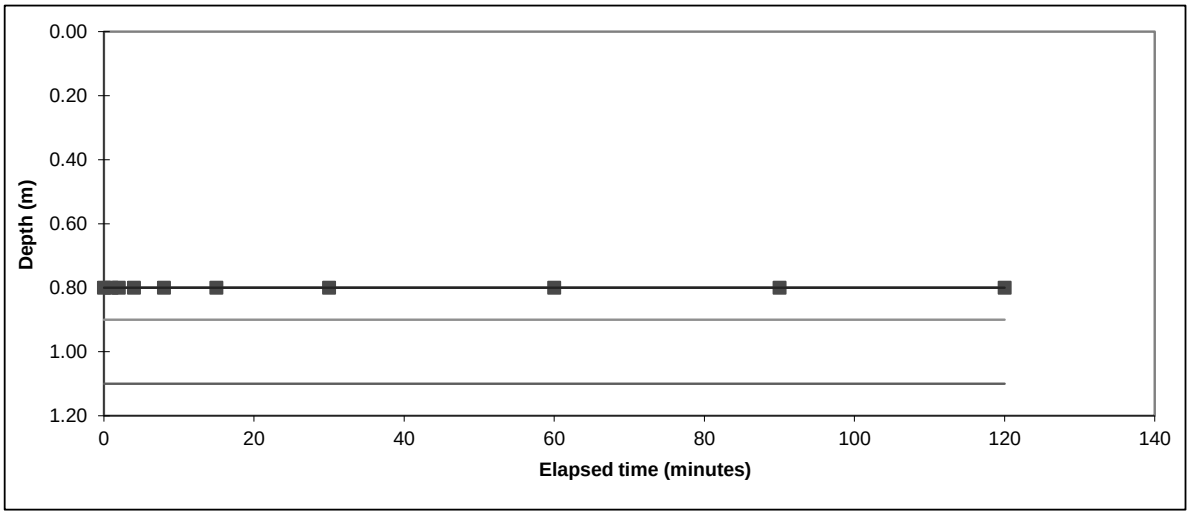
Client:	Mr Ali	**Job No:**
Site:	Kingsley Ave, Crosland Moor	C5760/26/E/8947

Rogers Geotechnical Services L

Soakaway Test

Trial Pit No:	TP03	Test No:	1	Date:	06/02/2026
Length (m):	0.500	Datum Height:		0.00	m agl
Width (m):	0.30	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	0.800		
1	0.800		
2	0.800		
4	0.800		
8	0.800		
15	0.800		
30	0.800		
60	0.800		
90	0.800		
120	0.800		



Start water depth for analysis (mbgl):	0.80		
75% effective depth (mbgl):	0.90	Elapsed time (mins):	#N/A
50% effective depth (mbgl):	1.00		
25% effective depth (mbgl):	1.10	Elapsed time (mins):	#N/A
Base of soakage zone (mbgl):	1.20		
Volume outflow between 75% and 25% effective depth (m^3):			
Mean surface area of outflow (m^2):		0.47	
(side area at 50% effective depth + base area)			
Time for outflow between 75% and 25% effective depth (mins):			

Soil infiltration rate (m/s):	**Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate.**

Remarks Results processed following BRE 365 (2007).

Client:	Mr Ali	**Job No:**
Site:	Kingsley Ave, Crosland Moor	C5760/26/E/8947