Environmental
Geotechnical
Specialists

RGS

# SOAKAWAY
# LETTER
# REPORT

| | |
|---|---|
| job number | C3124/23/E/5408 |
| date | 18/05/2023 |
| site address | 28 Low Cudworth Green,<br>Cudworth,<br>Barnsley,<br>S72 8EF |
| written by | S Hale |
| checked by | T Merry |
| issued by | S Hale |

Please consider the environment before printing this report.

Constructionline
A UK GOVERNMENT CERTIFICATION SERVICE

QMS ISO 9001 : 2015 REGISTERED Cert No. 14123657

QMS ISO 14001 : 2015 REGISTERED Cert No. 14127804

QMS ISO 45001 : 2018 REGISTERED Cert No. 14130281

CITATION APPROVED HEALTH & SAFETY SYSTEMS Registered Member

UKAS United Kingdom Accreditation Service

<ENVIRONMENTAL><GEOTECHNICAL>

# Contents



# Appendices

# Report on Soakaway Testing

| | | | |
|---|---|---|---|
| Location: | 28 Low Cudworth Green<br>Cudworth, Barnsley, S72 8EF | | |
| For: | Smart Developments (West Yorkshire) Ltd | | |
| Consultants: | Northern Design Partnership | | |
| Report No. | C3124/23/E/5408 | Report Date: | May 2023 |

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


| | |
|---|---|
| **Steven Hale** BSc<br>Geo-Environmental Technician | **Tobias Merry** MSci (Hons), FGS<br>Graduate Geo-environmental Engineer |


## Report Summary[1]

| Item | Comments | Section |
|---|---|---|
| Geology | No superficial geology overlaying Pennine Middle Coal Measures Formation. | 4. |
| Strata Conditions | Significant thickness of cohesive and granular made ground overlaying silty clay (weathered fraction of the underlying rock). | 5. |
| Groundwater | No groundwater strikes noted during investigation. | 5. |
| Suitability of Soakaways | Not recommended. | 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 16th May 2023 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

Two trial pits were excavated in order to undertake soakaway testing, the positions of which are shown in Appendix 1. 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 with the back-acting arm of the excavator, 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. Furthermore, it must be realised that the infilled pits represent an area of disturbance within the site soils, thus the soils at the pit locations may vary characteristically compared to the undisturbed ground. As such, foundations placed in this disturbed material may not perform as anticipated.

# 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] | Previous Name[3] | Description[3] |
|---|---|---|---|
| Superficial Geology | - | - | None indicated beneath the site. |
| Solid Geology | Pennine Middle Coal Measures Formation | Middle Coal Measures Formation | Interbedded grey mudstone, siltstone, pale grey sandstone and commonly coal seams, with a bed of mudstone containing marine fossils at the base, and several such marine fossil-bearing mudstones in the upper half of the unit. |

No superficial geology is noted to underlie the site, and as a result, the on-site soils are considered to consist of the weathered fraction of the bedrock geology.

# 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 |
|---|---|---|---|
| 0.60 | TOPSOIL (Dark brown slightly sandy gravelly clayey SILT with low cobble content). | TP01 | None |
| 0.40 | TOPSOIL (Dark brown sandy slightly gravelly clayey SILT). | TP02 | None |
| +1.29 | Soft to firm brown mottled light grey sandy slightly gravelly silty CLAY. | TP01 | None |
| 0.95 | Soft to firm brown mottled light grey slightly sandy silty CLAY. | TP02 | None |
| +1.28 | Firm light grey mottled brown slightly sandy 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.

[2] Sources: British Geological Survey (NERC) Map Sheets 87; Barnsley; Solid and Drift Edition, and Geology of Britain 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 to prevent collapse of the sides 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 | 2.20 x 0.50 | 0.81 to 1.29 | Side – Slightly gravelly, sandy, silty CLAY<br>Base – *As above* | - | Practically impermeable |
| TP02 | 2.10 x 0.40 | 0.65 to 1.28 | Side – Slightly gravelly, sandy, silty CLAY<br>Base – Firm light grey mottled brown slightly sandy silty CLAY. | - | Practically impermeable |

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 both trial pits. In both tests, there was no measureable movement noted in the water level. 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.

# 7. Discussion

The soils encountered beneath the topsoil were found to be typical of the weathered fraction of the underlying Pennine Middle Coal Measures Formation. The strata conditions and subsequent drainage characteristics appear to be comparable across the site. In this instance, the infiltration testing has revealed that the soils have practically impermeable drainage characteristics. Whilst the topsoil included gravel and cobbles, these soils cannot be recommended as a soakage stratum due to the potential for collapse compression. Therefore, soakaways cannot be recommended at this site and an alternative form of drainage should be adopted.

# 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


**Notes:**

Investigation positions approximated from site operative's notes.

RGS Environmental Geotechnical Specialists

**Rogers Geotechnical Services Ltd**

Offices 1 & 2, Barncliffe Business Park,
Near Bank,
Shelley,
Huddersfield,
HD8 8LU

**Telephone:** 0843 50 66 87
**www.rogersgeotech.co.uk**

| | |
|---|---|
| **Client:** | Smart Developments Ltd |
| **Job Number:** | C3124/23/E/5408 |
| **Project Details:** | Low Cudworth Green, Barnsley |
| **Scale:** | Not to scale - reference only |

# Appendix 2

## Trial Pit Records

# Trial Pit Log

Trialpit No **TP01**

Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project Name: Low Cudworth Green | Project No. C3124/23/E/5408 | Co-ords: - Level: | Date 16/05/2023 |
| Location: 28 Low Cudworth Green, Cudworth, Barnsley, S72 8EF | | Dimensions (m): Depth 1.29 — 2.2 × 0.5 | Scale 1:50 |
| Client: Smart Developments (West Yorkshire) Ltd | | | Logged SH |

| Water Strike | Samples and In Situ Testing: Depth | Type | Results | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|
| | | | | 0.60 | | | TOPSOIL (Dark brown slightly sandy gravelly clayey SILT with low cobble content. Sand is fine to medium. Gravel is angular to subrounded and fine to coarse of sandstone and brick. Cobbles are angular to sub-angular and less than 200mm of sandstone and brick. |
| | | | | 1.29 | | | Soft to firm brown mottled light grey sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is sub-angular to sub-rounded and fine to medium sandstone. |
| | | | | | | | End of pit at 1.29 m |

Remarks:

Stability: Stable

# Trial Pit Log

Trialpit No **TP02**

Sheet 1 of 1

| | | | |
|---|---|---|---|
| Project Name: Low Cudworth Green | Project No. C3124/23/E/5408 | Co-ords: - Level: | Date 16/05/2023 |
| Location: 28 Low Cudworth Green, Cudworth, Barnsley, S72 8EF | | Dimensions (m): Depth 1.28 — 2.1 × 0.4 | Scale 1:50 |
| Client: Smart Developments (West Yorkshire) Ltd | | | Logged SH |

| Water Strike | Samples and In Situ Testing: Depth | Type | Results | Depth (m) | Level (m) | Legend | Stratum Description |
|---|---|---|---|---|---|---|---|
| | | | | 0.40 | | | TOPSOIL (Dark brown sandy, slightly gravelly, clayey SILT. Sand is fine. Gravel is sub-angular and fine to medium sandstone). |
| | | | | 0.95 | | | Soft to firm brown mottled light grey slightly sandy silty CLAY. Sand is fine. |
| | | | | 1.28 | | | Firm light grey mottled brown slightly sandy silty CLAY. Sand is fine. |
| | | | | | | | End of pit at 1.28 m |

Remarks:

Stability: Stable

# Appendix 3

## Trial Pit Photographs

Photo 1: Image showing TP01.

Photo 2: Image showing TP02.

RGS Environmental Geotechnical Specialists

Site Name:

**28 Low Cudworth Green, Cudworth, Barnsley, S72**

Job No:

**C3124/23/E/5408**

t. 0843 50 666 87
www.rogersgeotech.co.uk

# Appendix 4

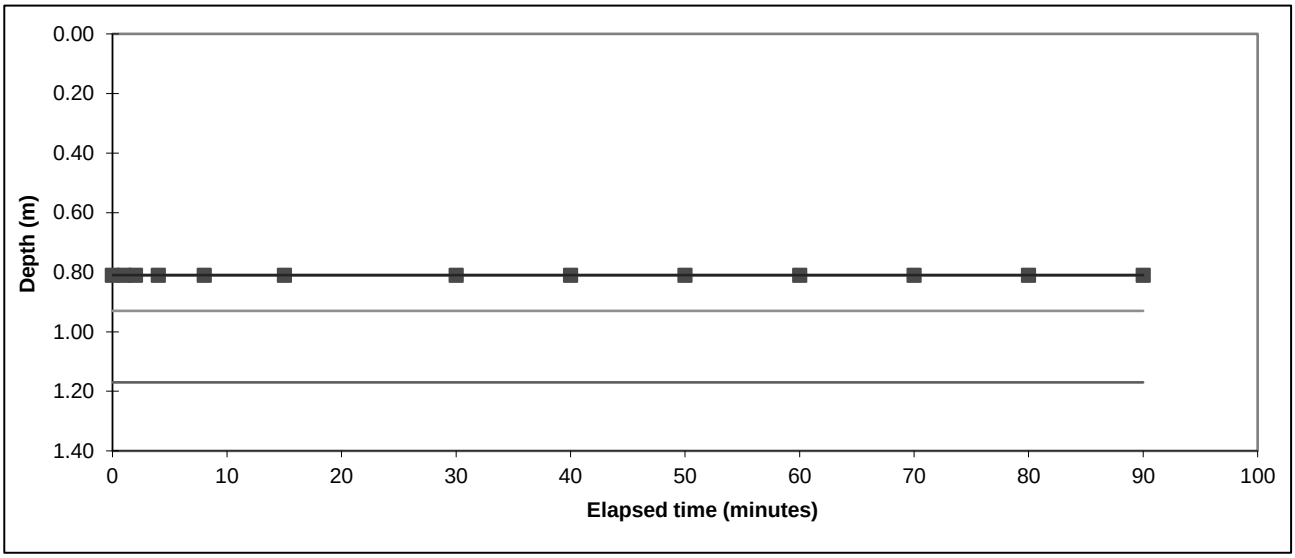
## Soakaway Results

# Rogers Geotechnical Services L

## Soakaway Test

| | | | | | |
|---|---|---|---|---|---|
| Trial Pit No: | TP01 | Test No: | 1 | Date: | 16/05/2023 |
| Length (m): | 2.200 | | Datum Height: | 0.00 | m agl |
| Width (m): | 0.50 | | Granular infill: | None | |
| Depth (m): | 1.29 | | Porosity of infill: | 1 | (assumed) |

| Elapsed time (minutes) | Water Depth (m below datum) | Elapsed time (minutes) | Water Depth (m below datum) |
|---|---|---|---|
| 0 | 0.810 | | |
| 1 | 0.810 | | |
| 2 | 0.810 | | |
| 4 | 0.810 | | |
| 8 | 0.810 | | |
| 15 | 0.810 | | |
| 30 | 0.810 | | |
| 40 | 0.810 | | |
| 50 | 0.810 | | |
| 60 | 0.810 | | |
| 70 | 0.810 | | |
| 80 | 0.810 | | |
| 90 | 0.810 | | |




| | | | |
|---|---|---|---|
| Start water depth for analysis (mbgl): | 0.81 | | |
| 75% effective depth (mbgl): | 0.93 | Elapsed time (mins): | #N/A |
| 50% effective depth (mbgl): | 1.05 | | |
| 25% effective depth (mbgl): | 1.17 | Elapsed time (mins): | #N/A |
| Base of soakage zone (mbgl): | 1.29 | | |
| Volume outflow between 75% and 25% effective depth ($m^3$): | | | |
| Mean surface area of outflow ($m^2$): | | | 2.40 |
| (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).<br>No movement in the water - practically impermeable. |

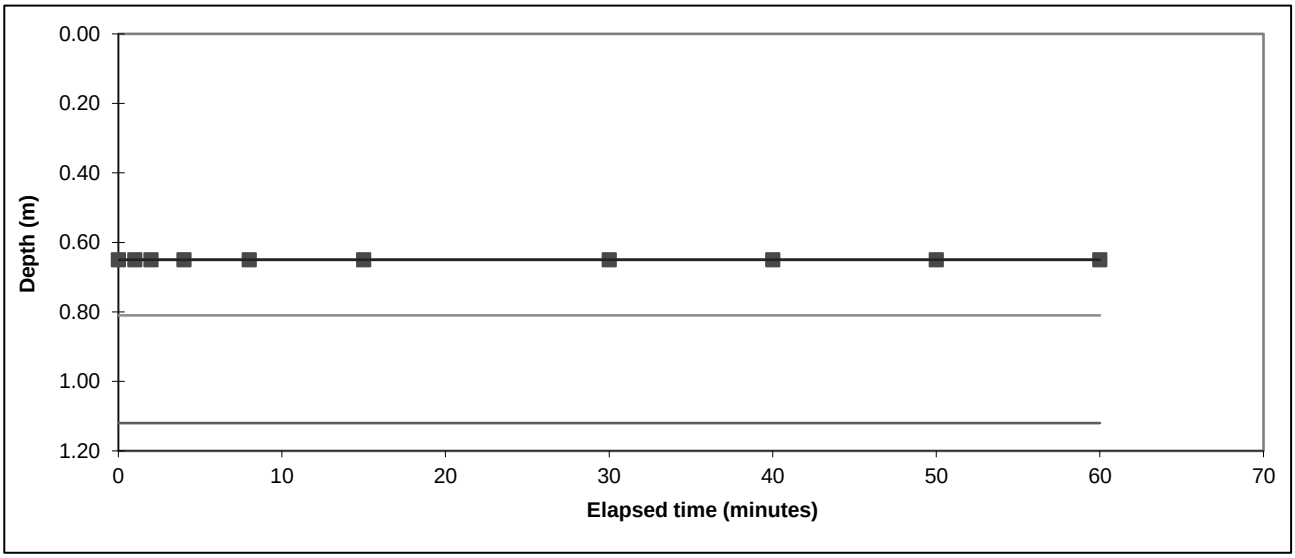
| | | |
|---|---|---|
| **Client:** | Smart Developments (West Yorkshire) Ltd | **Job No:** |
| **Site:** | 28 Low Cudworth Green, Cudworth, Barnsley. S72 8EF | C3124/23/E/5408 |

# Rogers Geotechnical Services L

## Soakaway Test

| | | | | | |
|---|---|---|---|---|---|
| Trial Pit No: | TP02 | Test No: | 1 | Date: | 16/05/2023 |
| Length (m): | 2.100 | | Datum Height: | 0.00 | m agl |
| Width (m): | 0.40 | | Granular infill: | None | |
| Depth (m): | 1.28 | | Porosity of infill: | 1 | (assumed) |

| Elapsed time (minutes) | Water Depth (m below datum) | Elapsed time (minutes) | Water Depth (m below datum) |
|---|---|---|---|
| 0 | 0.650 | | |
| 1 | 0.650 | | |
| 2 | 0.650 | | |
| 4 | 0.650 | | |
| 8 | 0.650 | | |
| 15 | 0.650 | | |
| 30 | 0.650 | | |
| 40 | 0.650 | | |
| 50 | 0.650 | | |
| 60 | 0.650 | | |




| | | | |
|---|---|---|---|
| Start water depth for analysis (mbgl): | 0.65 | | |
| 75% effective depth (mbgl): | 0.81 | Elapsed time (mins): | #N/A |
| 50% effective depth (mbgl): | 0.97 | | |
| 25% effective depth (mbgl): | 1.12 | Elapsed time (mins): | #N/A |
| Base of soakage zone (mbgl): | 1.28 | | |
| Volume outflow between 75% and 25% effective depth ($m^3$): | | | |
| Mean surface area of outflow ($m^2$): | | 2.39 | |
| (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).<br>No movement in the water - practically impermeable. |

| | | |
|---|---|---|
| **Client:** | Smart Developments (West Yorkshire) Ltd | **Job No:** |
| **Site:** | 28 Low Cudworth Green, Cudworth, Barnsley. S72 8EF | C3124/23/E/5408 |