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Consultants

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GROUND INVESTIGATION SERVICES (Southern) Ltd

Our Ref: S.5848

Your Ref:

David Beattie

08 February 2022

Dear Sirs

GROUND INVESTIGATION: GRACELANDS, HILLESDEN MK18 4DD

We write to inform you of the ground conditions encountered in respect of the above and make recommendations with regard to the proposed development. Accordingly, please find enclosed location plan, borehole logs, trial pit logs, infiltration test data and laboratory test results.

It is proposed to construct a new house over the footprint of the existing bungalow which will be demolished.

Therefore, prior to development it was required to undertake a site investigation to establish permeability and strength of the underlying soils to determine the potential of the ground to accept surface drainage water discharge and allow design of foundations and drainage infrastructure.

Reference to the geological map for the area indicates the site is underlain by Till-Diamicton characterised by clay.

GEOTECHNICAL SURVEY

On the 17 and 18 January 2022 GIS personnel attended site and conducted a geotechnical survey which comprised the following works:

- Two boreholes were sunk to depths of 10.00m and 3.00m using windowless sampling techniques utilising 66-116mm diameter bores located close to the proposed development footprint. In-situ Standard Penetration Tests (SPTs) were performed at regular 1.00m depth intervals in order to provide an indication of the engineering behaviour of the soil. Representative Class 3 small disturbed samples from the SPT sampling tool were recovered. Upon completion the boreholes were decommissioned with arisings.

- Three trial pits were excavated to depths of 0.60m, 1.00m and 1.50m depth and subject to percolation testing in accordance with BRE Digest DG365 soakaway design.

- Soil samples were obtained from each intrusive test position for geotechnical land chemicals laboratory soil analysis.

The weather was cold and dry

Soil samples were submitted to the chemical laboratories of Element Materials Technologies Ltd on the 24 January 2022 for analysis of a range of chemical determinants. Other laboratory tests including Atterberg limits/natural water content were undertaken in-house.

All information pertaining to the excavation works above is presented in the Borehole Logs, Trial Pit logs and Infiltration test logs and with reference to the Notes and Abbreviations Sheet, presented to the rear of this report

RESULTS OF SITE INVESTIGATION

The site consists of a large plot of residential land which until recently was occupied by a bungalow which has been razed. Notably a large Acacia tree was also removed which has been classified as moderate water demand[1] for species identified. The client recorded this as between 10-12m distance from the nearest edge of the south west elevation to the proposed new property.

In summary, the results of the intrusive site work indicate the site is underlain by a capping layer of topsoil and made ground overlying Till-Diamicton.

Made ground was exposed in BH2, SA1 and SA3 from ground level to depths between 0.45m (SA3) and 1.20m (BH2). The formation consists of loose dark brown silty sand with much gravel sized and cobble sized brick, general stone and concrete.

Topsoil was recorded in BH1 and SA2 to depths of 0.40m/0.25m and found to comprise dark brown silty fine humic sand.

The Till Diamicton was encountered in each test position beneath the capping layers of made ground and topsoil, consisting of a mantle of generally soft to firm in SA1, SA2 and BH2 and firm to stiff in BH1/SA3, light grey and light brown intact clay with rare fine medium flint gravel. This layer becomes progressively stiff to very stiff with increasing depth. There was a notable difference in the consistency in the shallow (<2.00m depth) clay mantle between the front/side garden where soils are described as soft/firm and the rear garden where the clay is described as stiff. This stiffness is ascribed to induration of clay soils resulting from localised tree root dehydration. With increasing depth the clay becomes very stiff, dark grey with traces of fine medium sandstone gravel and selenite crystals.

Infiltration tests (BRE DG365) were performed in three trial pits. Potable water was introduced into the pits and allowed to fall while measurements of the falling water levels were recorded over a single day

Water levels in SA1 and SA2 remained static while in SA3, water levels fell by 350mm in six hours. There were insufficient data to calculate a soil infiltration rate for either trial pit.

The results of geotechnical laboratory testing indicate the Till-Diamicton from 0.50m to 3.00m depths is classified as inorganic clay of high and very plasticity and predominantly high volume change potential.

All samples, apart from 1.00m depth sample from BH1 which were desiccated[2] were normally hydrated with natural water content values in equilibrium condition.

[1] NHBC Technical Standards Chapter 4.2 *Building near trees 2005*
[2] BRE 412 Desiccation in clay soils

Chemical testing indicate neutral to alkaline pH soil conditions in all samples and elevated concentrations of water soluble and acid soluble sulphate and sulphur.

GEOTECHNICAL ASSESSMENT AND FOUNDATION OPTIONS

New development will comprise a two-storey house located over the footprint of the original structure

Anticipated bearing pressures for the new structure are estimated to be in the order of 50kN/metre run for perimeter walls including suspended floor slab but excluding other factors including wind and live loads.

Assessment of the foundation options relevant to the proposed design build are predicated on the basis of ground conditions, anticipated bearing pressures, site history and design layout.

It is understood that a number of mature and semi-mature trees are located along site boundaries and into neighbouring property within proximity to the new building, therefore the first principal critical governing factor influencing foundation design at this site is the volume change potential of the soil and the type and distance of trees to new foundations.

At this site one tree of note was identified according to the client as an Acacia approximately 10-12m distance from the closest foundation edge.

Site plan provided by the client has been used to calculate projected minimum foundations depths as follows:

Table 4: Tree Spaces and Foundation Depths – Main House

Tree Species	Keep or Removed (K or R)	Minimum Distance to proposed foundations (m)	Tree Height – existing (m)	Water Demand Tree classification (NHBC)	Minimum foundation depth (NHBC) (m) *Existing tree height*
Acacia	R	10.00m (Southwest Facing elevation)	15	Moderate	1.25m

Because the site was previously developed with substructures in place (foundations) and walls above, the soil beneath these load bearing structures will have been compressed to a greater magnitude than neighbouring unstressed soils. The footprint of the new development (main house and garage) will overlie both of these soil units and settlement characteristics will not be uniform, i.e. settlement for new foundations will less over previously stressed soils when compared to unstressed soils leading to potential differential settlement.

Therefore, the ground beneath the existing foundations will have been stressed to a depth 1½ times the breadth of the foundation (assuming 0.60m wide and 1.00m deep for main house equivalent to 1.90m depth.

Therefore, to avoid the possibility of large differential movements occurring beneath different sections of load bearing walls, foundations for the house should be constructed at a minimum depth of 1.90m (based on the above assumptions).

At this level, a net allowable bearing pressure of 110kpa is advised for 600mm wide strip foundations which would provide an adequate factor of safety against shear failure and limit settlements to within 25mm which should take place over a number of years.

The impact of potential heave from re-hydration and conversely continued desiccation and volumetric shrinkage from tree root moisture uptake cannot be overstated. Measures to mitigate these effects on buried foundation concrete should be implemented such as the use of clayboard on the inside face and plastic slip membrane on exterior faces.

Notwithstanding the above recommendations, the final depths of all foundations will have to be determined with respect to their proximity to the existing trees and hedging on and bordering the site and beyond (either those to be removed or retained and future planting), their water demand classification and the shrinkage potential of the soil. In addition, where the foundations are likely to be affected by either shrinkage or soil heave they should be designed to withstand these possible effects.

It is recommended suspended ground floor slabs are adopted for the development as a result of the potential for clay soil shrinkage and swelling. Reference to NHBC Standards, Chapter 5.2 – *Suspended Floors* is advised.

EXCAVATIONS

Excavations for foundations and service trenches will remain stable in the long term but will require temporary shoring if left open for an extended period of time.

It is recommended all excavations in excess of 1.20m depth should be supported or the excavation sides cut back to a safe angle of repose (approximately 35˚) although steeper angles (50˚) may be permitted for short term duration in compliance with health and safety at work requirements and in accordance with advice given the Construction Design and Management Regulations (2015).

BURIED CONCRETE SPECIFICATION

The characteristic value for the water soluble sulphate results for the soils tested falls into Design Sulphate Class of DS-1, DS-2 and DS-3 in Table C2 of the BRE Special Digest 1. As the site is potentially pyritic and assuming the concrete may be exposed to disturbed ground in which pyrite may oxidize to sulphate, the oxidisable sulphide content of the soils must be calculated using the total sulphur and acid soluble sulphate results.

The results indicate two samples (3.00m and 8.00m depths) of the bedrock soils have an oxidisable sulphide content which exceeds the 0.3% level given in the Digest and indicates that pyrite is probably present. The remaining samples <3.00m depths have an oxidisable sulphide content which does not exceed the 0.3% level.

Therefore, given that buried concrete will not exceed 2.50m depths The calculated characteristic value for total potential sulphate gives a sulphate class equivalent of DS-2.

It recommended that Design Sulphate Class of DS-2 and ACEC class of AC-1s would be appropriate for concrete in contact with the bedrock soils.

PERMEABILITY ASSESSMENT AND SOAKAWAY DESIGN

Infiltration testing has demonstrated in general the poor drainage characteristics of the host soils to discharge drainage waters.

The test data has revealed that the bedrock soils are generally unsuitable for discharge of surface drainage water via local soakaway drains.

If it is decided ground conditions are unsuitable for local discharge of surface drainage waters then all surface water run-off from impermeable surfaces should be directed off site via the public sewer, subject to approval by the local authority/water company.

Alternatively, the client may consider the possibility that drainage via the limestone rock bed may be feasible if this layer could be penetrated by heavy duty plant for a thickness of at least 1.00m and retested to determine its effectiveness as a drainage medium.

Should you have any queries with regard to the report, please do not hesitate to contact the undersigned.

For and on behalf of
Ground Investigation Services (Southern) Ltd
Yours sincerely

Martyn P Boughton (Director)

Email: martyn@gis-geotec.com

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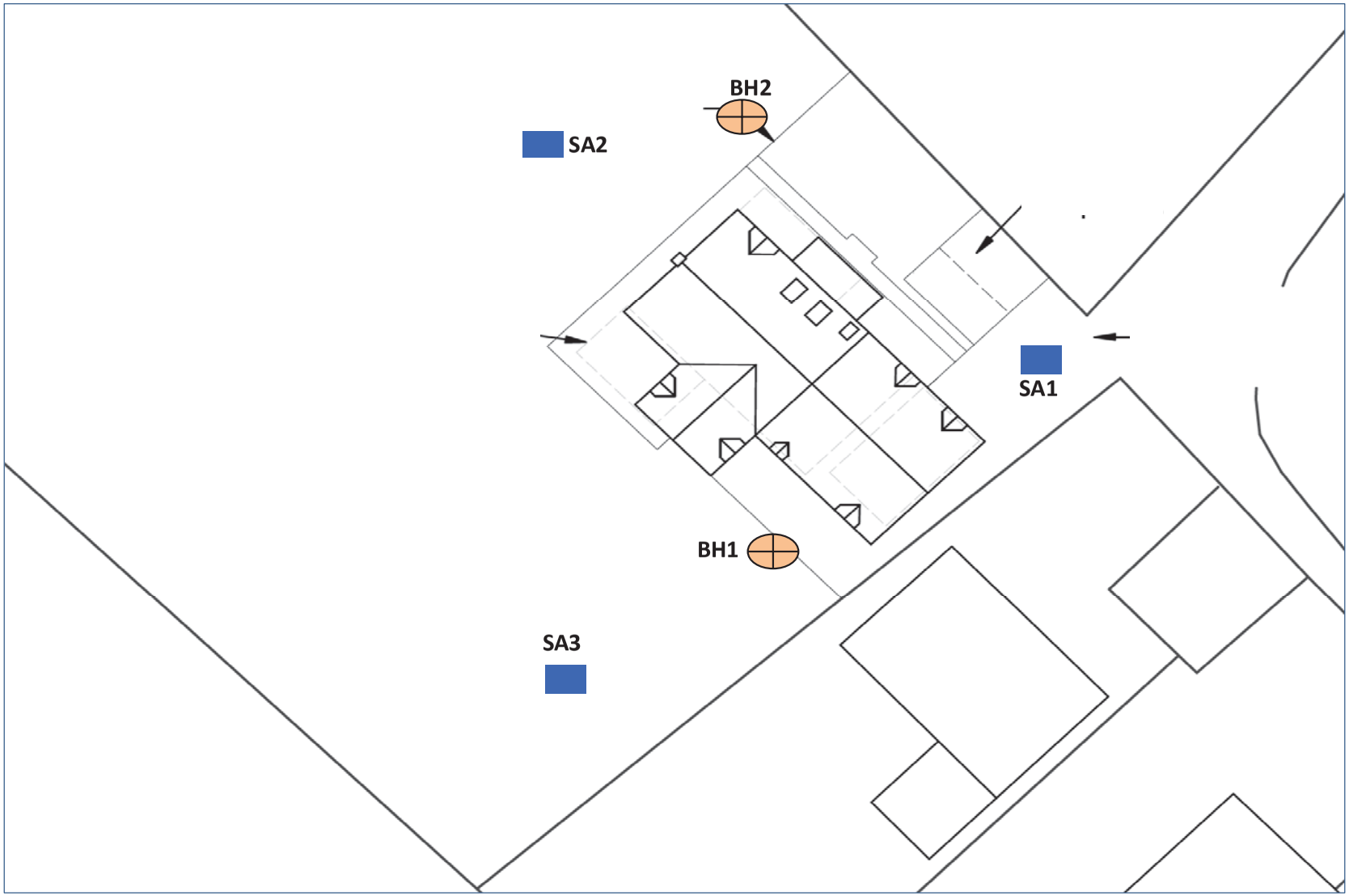
Site Plan
Borehole Logs
Trial Pit Logs and Infiltration Test results
Notes and Abbreviations Sheet
Laboratory test data



Client: David Beattie

Site: Gracelands, The Barracks, Hillesden MK18 4DD

Date: February 2022

Trial Pit and Infiltration Test

Windowless Sampling Borehole

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton OX13 6DD
Tel 01865 326011

TRIAL PIT/BOREHOLE LOCATION PLAN

Report No. S.5848

Fig 1

NOTES ON EXPLORATORY HOLE RECORDS

GENERAL NOTES

1 OPERATING PROCEDURES

The procedure used for cable percussion boring, rotary drilling, trial pitting, sampling, in situ and laboratory testing and sample descriptions are generally in accordance with BS5930:2015+A1:2021'Code of practice for Ground investigations', BS EN ISO 14688-1:2002 'Geotechnical investigation and testing – Identification and classification of soil – Part 1 Identification and description', BS EN ISO 14689-1:2003 'Geotechnical investigation and testing – Identification and classification of rock – Part 1 Identification and description' as appropriate, and BS1 377:1990 'Methods of test for soils for civil engineering purposes', unless stated otherwise.

2 GROUNDWATER

Exploratory hole water levels are recorded together with the depths at which seepages or inflows of water are detected. These observations are noted on the Records, but may be misleading for the following reasons:

a) The exploratory hole is rarely left open at the relevant depth for a sufficient time for the water level to reach equilibrium.

b) A permeable stratum may have been sealed off by the borehole casing.

c) Water may have been added to the borehole to facilitate progress.

d) The permeability may have been altered by the excavation/boring/drilling process.

Standpipes or piezometers should be installed when an accurate record of groundwater level is required, however, it should be noted that groundwater levels may vary significantly due to seasonal, climatic or man made effects. Water levels recorded during the investigation and any advice or comment made accordingly may, therefore, not be appropriate to particular foundation, geotechnical design, or temporary works solutions. Long term monitoring of standpipes or piezometers is always recommended when water levels are likely to have a significant effect on design.

3 CHISELLING

The remarks in the Borehole Records contain information on the time spent advancing the borehole by 'Chiselling Techniques', and the depth of borehole over which it was required. Such information may be affected by a wide range of variable factors, unrelated to the geotechnical properties of the strata. Such factors include, but are not restricted to: plant, equipment and operator. The data should, therefore, only be used subjectively and with extreme caution.

4 IDENTIFICATION AND DESCRIPTION OF SOILS - SEE SEPARATE SHEET

The identification system follows the Company's Engineering: Geotechnical Procedures Manual which is based on BS EN ISO 14688-1:2002 and appropriate clarifications in the National Foreword, BS 5930:1999 and BS EN ISO 14689- 1:2003

Relative density terms are given where supported by SPT N values, with the exception of Made Ground. The field assessment of compactness or relative density for coarse grained soils is only given on trial pit records where appropriate assessment of the soils has been undertaken.

Where the terms 'soft to firm', 'firm to stiff' etc. are used they indicate a strength which is close to the borderline between the two terms and cannot be precisely defined by inspection only, and/or which is indicated as borderline or ranging between the two terms after consideration also of in situ and laboratory test results. Consistencies may have been amended in the light of test results

Where 'to' links two terms, as in 'slightly sandy to sandy' this again represents a borderline case or a range, where the precise proportions cannot be determined as outlined previously.

The name of the geological formation is only given where this has been requested and can be determined with confidence (see Clause 41.5 of BS 5930:1999).

5 INTERPRETATION OF THE RESULTS OF THE INVESTIGATION

The description of ground conditions encountered and any engineering interpretation included in the report are based on the results of the boreholes and trial pits and the field and laboratory testing carried out. There may be ground conditions at the site which have not been revealed by the investigation and consequently have not been taken into account.

Any interpolation or extrapolation of strata between exploratory holes shown on any cross sections or site plans is an estimate only of the likely stratification based on general experience of the ground conditions and is subject to the interpretation of the reader.

The term "TOPSOIL" is used in this report to describe the surface, usually organic rich, layer including turf, subsoil and weathered material with roots. The use of this term may not imply that the soil satisfies the requirements of Clause 3 of BS 3882:1994, 'Specification for topsoil', or is suitable for general horticultural and agricultural purposes.

Laboratory test results in this report give the soil properties of individual specimens tested under specified conditions. Individual results or groups of results may not be appropriate for use as design parameters for some geotechnical analyses. The samples may be non-representative, disturbed internally, or prepared and tested under conditions suited for different geotechnical applications. Unless the selection of design parameters is discussed in this report, it is recommended that the advice of a Geotechnical Specialist is sought.

NOTES ON EXPLORATORY HOLE RECORDS

IN SITU TESTING AND SAMPLING

STANDARD PENETRATION TESTS

S( ) Standard Penetration Test (SPT). A 50mm diameter split barrel sampler is driven 450mm into the soil using a 63.6kg hammer with a 760mm drop. The penetration resistance (also known as the 'N' value) is expressed as the number of blows required to obtain 300mm penetration below an initial seating drive of 150mm which is taken through any ground which may be disturbed at the base of the borehole. The test is usually completed when the number of blows recorded during the test drive only reaches 50 in soils or 100 in weak rock. If a sample is not recovered in the sampler, a disturbed sample is taken on completion of the test and given the same depth as the top of the Standard Penetration Test drive.

C( ) Standard Penetration Test carried out with a 60 degree cone. The test is usually conducted in coarse granular soils or weak rock using the same procedure as for the SPT, but with a 50mm diameter, 60 degree apex, solid cone fitted to the split barrel. A bulk disturbed sample is taken and given the same depth as the top of the test drive.

The depth on the borehole record at the left hand side of the 'depth' column is that at the start of the normal 450mm penetration. Where the full penetration of 300mm for the test drive is obtained, the penetration resistance ('N' value) is reported in the 'SPT Blows/N' column. If the full penetration of 300mm in the test drive is not obtained, then the length of drive (test length in mm) and the penetration resistance (number of blows) are both reported. Blows through the initial seating drive (normally 150mm) are not reported.

* in the 'Test Length' column denotes that the blows and penetration were all in the initial Seating Drive section.

OTHER IN SITU TESTS

The following in situ tests are reported on the **Exploratory Hole Records**, in the 'Test' or 'Type' and 'Results' columns where appropriate.

k In situ Permeability Test - refer to detailed test results for permeability values

PMT Pressuremeter Test - refer to detailed test results for modulus values, etc.

VN/R( ) Borehole Shear Vane Test (undrained shear strength - c_u - in kPa) - refer also to detailed test results, N - 'Natural' or peak shear strength, R - Remoulded shear strength

VN/R( ) Hand Shear Vane Test (Direct reading of undrained shear strength in kPa). 'N' and 'R' as above. The values are indicative and should not be taken as being equivalent to laboratory test results. The Pilcon vane results have a factor varying from about a sixth for the 33mm vane to a third for the 19mm vane which reduces the BS1 377 shear vane value. The values presented are therefore approximate and should be treated with great caution if used for design purposes

PP( ) Pocket Penetrometer. Unconfined Strength (UCS) reported in kg/cm^2 to the nearest 0.25 kg/cm^2 or kPa with the same accuracy. Equivalent c_u in kPa is very approximately UCS x 50. Pocket Penetrometers are an aid to logging of cohesive soils, the results are indicative and should not be relied upon. The equipment used is not calibrated

CBR( ) California Bearing Ratio Test (CBR%) - refer also to detailed test results

PID( ) Photo-Ionisation Detector Readings in headspace of small disturbed chemical samples. Result given in ppm by volume

SAMPLES

U General purpose open tube sample. Sample normally taken with open tube sampler approximately 0.1m diameter and 0.45m long and driven with 80kg sinker bar and 56kg sliding hammer, unless noted otherwise. "XX" in U100 blows column denotes the number of hammer blows. The height of hammer drop can be variable depending on operator technique. Depths are given to the top of the sample if full penetration and recovery are achieved, otherwise actual lengths of penetration and recovery are given in the appropriate columns.

U(X) General purpose open tube sample (X) mm diameter

TW(X) Thin wall (push) sample (X) mm diameter

P(X) Piston sample (X) mm diameter

CBR Sample taken in CBR Mould

D Small disturbed sample (plastic tub or jar with air tight lid)

B Bulk disturbed sample (polythene bag, tied at neck - size dependent on purpose)

W Water sample

Sample not recovered

C Core sample (CS – short core, generally about 100mm; CL – long core, generally 200mm to 300mm)

CD Sample for chemical analysis in a plastic tub

K Sample for chemical analysis in an amber glass jar

V Sample for chemical analysis in a glass vial

CDKV Set of samples for chemical analysis as above

WAC Sample for Waste Acceptance Criteria

ES Environmental Sample

EW Environmental Water Sample

Recommended symbols for soils and rocks – BS 5930:2015+A1:2021

 Made ground

 Topsoil

 Boulders and Cobbles

 Gravel

 Sand

 Silt

 Clay

 Peat

Composite soil types may signified
By combined symbols, e.g.

 Sandy CLAY with a trace of fine medium gravel

 Silty slightly clayey SAND

 Chalk

 Limestone

 Conglomerate

 Brecia

 Coal

 Shale

 Siltstone

 Sandstone

 Mudstone/Claystone

NOTES ON EXPLORATORY HOLE RECORDS

IDENTIFICATION AND DESCRIPTION OF SOILS

	Basic Soil Type	Particle Size (mm)		Visual Identification
Very Coarse Soils	BOULDERS		200	Large Boulders >630mm. These soils only seen complete in pits or exposures. Often difficult to recover from boreholes.
	COBBLES			
COARSE SOILS (Typically over 65% Sand & Gravel Sizes)	GRAVEL	coarse	63	Easily visible to naked eye; particle shape can be described, grading can be described. Well graded: wide range of grain sizes, well distributed. Poorly graded: not well graded. (May be uniform: size of most particles lies between narrow limits; or gap graded; an intermediate size of particle is markedly under represented).
		medium	20	
		fine	6.3	
			2	
	SAND	coarse	0.63	Visible to naked eye; no cohesion when dry; grading can be described. Well graded and poorly graded: as above
		medium	0.2	
		fine		
FINE SOILS (Typically over 35% Silt & Clay Sizes)	SILT	coarse	0.063	Only coarse silt visible with hand lens; exhibits little plasticity and marked dilatancy; slightly granular or silky to touch. Disintegrates in water; lumps dry quickly; possesses cohesion but powders easily between fingers. Term "SILT" or "CLAY" must be used, "SILT/CLAY" not allowed. Dry lumps can be broken but not powdered between the fingers; they also disintegrate under water but more slowly than silt; smooth to the touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying usually showing cracks. Intermediate and high plasticity clays show these properties to a moderate and high degree, respectively.
		medium	0.02	
		fine	0.0063	
	CLAY		0.002	
Organic Soils	ORGANIC CLAY, SILT or SAND	Varies		Contains varying amounts of organic vegetable matter - defined by colour: grey - slightly organic; dark grey – organic; black – very organic.

Composite Soil Types (Mixtures of basic soil types)

Scale of secondary constituents with coarse and very coarse soils. Term before, description after

Term before (term in ' [ ] ' may be used for 2nd ry parts, matrix etc)	Principal Soil Type	Description after	Approx % 2nd ry soil type
Slightly (sandy*) [occasional / little]	SAND, GRAVEL; (COBBLES OR BOULDERS (See notes)	Used to describe components of secondary constituents. e.g. Gravel is fine and medium subangular fine sandstone and mudstone.	<5
--(sandy*) [some]			5 – 20
Very (sandy*) [much / many]			20 to 40†
--		and (sand*) or and (cobbles+)	50†

* Fine or coarse soil type as appropriate
\+ Very coarse soil type – see Notes
† described as fine soil depending on behaviour

Scale of secondary constituents with fine soils. Terms before, description after principal constituent.

Term before	Principal Soil Type	Description after	Approx % 2nd ry soil type
Slightly (sandy*)	CLAY OR SILT	Used to describe components of secondary constituents e.g. gravelly sandy CLAY. Gravel is coarse rounded quartzite	<35
-- (sandy*)			35 to 65†
Very (sandy*)			>65†

* Coarse soil type as appropriate
† or described as coarse soil depending on mass behaviour

EXAMPLES OF COMPOSITE TYPES
(indicating preferred order for description)

Loose brown very sandy subangular coarse GRAVEL with many pockets (<5mm across) of soft grey clay.

Firm thinly interlaminated brown SILT and CLAY. Dense light brown clayey fine and medium SAND.

Density / Consistency / Peat Condition

For very coarse soils qualitative description by inspection of voids and particle packaging.

Standard Penetration Test in Boreholes for Coarse Soils

No of blows	Relative Density
<4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
>50	Very Dense
Slightly cemented	Visual Examination: pick removes soil in lumps which can be abraded.

Silty CLAY or clayey SILT – use prefix only when secondary constituent has significant affect on material characteristics. Terms 'slightly' or 'very' not applicable.

Consistency

Very soft	Finger easily pushed in up to 25mm. Exudes between fingers
Soft	Finger pushed in up to 10mm. Moulded by fingers
Firm	Thumb makes impression easily. Rolls to thread
Stiff	Can be indented slightly by thumb. Crumbles if rolled
Very Stiff	Indented by thumbnail. Cannot be moulded
Hard	Can be scratched by thumb nail
Firm Peat	Fibres compressed together
Spongy Peat	Very compressible, open
Plastic Peat	Moulded in hand, smears

Structure

Term	Field Identification
Homo-geneous	Deposit consists essentially of one type
Interbedded or interlaminated	Alternating layers of varying types. Pre-qualified by thickness term if in equal proportions. Otherwise thickness of, and spacing between, subordinate layers defined
Hetero-geneous	A mixture of types
Weathered (granular)	Particles may be weakened and may show concentric layering
Weathered (cohesive)	Usually has crumb or columnar structure
Fissured	Breaks into blocks along unpolished discontinuities
Sheared	Breaks into blocks along polished discontinuities
Intact	No fissures
Fibrous Peat	Plant remains recognisable and retain some strength. When squeezed only water, no solids
Pseudo-fibrous Peat	Plant remains recognisable, strength lost. Partial decomposition. Turbid water when squeezed, <50% solids
Amorphous Peat	Recognisable plant remains absent, full decomposition. When squeezed only paste with >50% solids
Gyttja	Decomposed plant & animal remains, maybe inorganic constituents
Humus	Plant remains, living organisms & inorganic constituents in topsoil

Interval Scales

Scale of Bedding Spacing	Mean Spacing (mm)	Scale of Spacing of Other Discontinuities / [Blocks]
Very thickly bedded	over 2000	Very widely spaced / [Very large]
Thickly bedded	2000-600	Widely spaced / [Large]
Medium bedded	600-200	Medium spaced / [Medium]
Thinly bedded	200-60	Closely spaced / [Small]
Very thinly bedded	60-20	Very closely / [Very small]
Thickly laminated	20-6	Extremely closely spaced
Thinly laminated	under 6	

Spacing terms may also be used for distance between partings, isolated beds or laminae, desiccation cracks, rootlets etc. Terms such as partings or dustings may be used for laminae less than 2mm and less than 0.6mm respectively.

Discontinuity Shape (See Standard for Persistence/Openness)	Small scale (mm's) rough, smooth Medium scale (cm's) planar, stepped, undulating Large scale (m's) wavy, curved, straight

Particle Nature

Particle Shape & Form

Very angular
(Sub) angular
(Sub) rounded
Well rounded

Low Sphericity
Flat or Elongate

High Sphericity
Cubic

Particle Surface Texture

Rough
Smooth
Polished

NOTES Identification and descriptive method, and descriptions, generally in accordance with BS5930:2015+A1:2021 Section 6 clauses 41 and 43 and BS EN ISO 14688 1:2002
Additional notes relating to BS EN ISO 14688-2:2004 – modified terms for content of secondary fraction given in Annex B Table B1 are not comparable to 5930 and are not be used.
Organic Content :- Low – 2 to 6%; Medium - 6 to 20%; High - >20%. Terms not used on borehole records
Carbonate content :- Only noted if field test with dilute HCl undertaken – Carbonate free if no effervescence; Calcareous if slight effervescence; Highly calcareous if strong reaction
Undrained shear strength :- terms from laboratory or in situ tests not given on borehole records.
Very Coarse Soils – described by initially removing very coarse materials and describing residue before adding back the very coarse soils. If residue is cohesive then described as ' (COBBLES / BOULDERS) with low (cobble / boulder) content with (some / much etc) matrix of ' If residue is granular then described as ' with matrix of ' or as a coarse soil. **Cobbles :-** <10% - low cobble content; 10 to 20% - medium content; >20% - high content; **Boulders** <5% - low boulder content; 5 to 20% - medium content; >20% - high content

GROUND INVESTIGATION SERVICES (SOUTHERN) LTD

Date	Borehole No.
February 2022	**One**

CLIENT	Ground Level (m OD)	Co-ordinates	Sheet 1 of 1
Focus Consulting			
SITE LOCATION	**Boring Method:**	**Diameter of (*casings*) and bore:**	Report No.
Gracelands, The Barracks, Hillesden MK18 4DD	Windowless Sampling	76, 86, 96,101 & 116	**S.5848**

SAMPLES AND TESTS											Windowless Sample Recovery	Water depth	Reduced Level	Depth (thickness)	Legend	Strata Description	Backfill/ Installation	Depth
Depth	Type	SPT records energy ratio = 58.3%					'N' Value	PID	Hand pen'									
metres	& No.	150mm	75mm	75mm	75mm	75mm		ppm	kN/m2			m	m (AOD)	metres				
											GL-1.00 90%					Dark brown sandy clay with some fine medium roots **TOPSOIL**	ARISINGS	
														0.40				
														(0.40)		Firm to stiff brown mottled grey intact CLAY with some fine medium roots		
														0.80				
1.20-1.65	1/DS	4	4	4	5	5	18				1.00-2.00 100%					Stiff grey weakly mottled light grey and brown intact CLAY with many fine medium roots		1
1.20-2.00	2/U116													(1.00)				
														1.80				
2.00-2.45	3/DS	4	3	4	4	5	16				2.00-3.00 100%					Stiff grey mottled brownish grey intact CLAY		2
2.00-3.00	4/U101													(0.80)				
														2.60				
3.00-3.45	5/DS	7	5	6	8	10	29				3.00-4.00 80%					Stiff to very stiff brownish grey intact and fissured and blocky CLAY. Joint sets are sub horizontal and sub vertical		3
3.00-4.00	6/U101													(2.20)				
4.00-4.45	7/DS	9	7	8	9	10	34				4.00-5.00 100%							4
4.00-5.00	8/U96																	
														4.80				
5.00-5.45	9/DS	11	8	10	10	11	39				5.00-6.00 100%					Very stiff grey and dark grey intact CLAY with a trace of fine medium sandstone gravel		5
5.00-6.00	10/U96																	
6.00-6.45	11/DS	5	5	5	7	9	26				6.00-7.00 100%							6
6.00-7.00	12/U86																	
7.00-7.45	13/DS	8	5	7	7	8	27				7.00-8.00 100%							7
7.00-8.00	14/U86													(5.20)				
8.00-8.45	15/DS	10	8	9	10	10	37				8.00-9.00 100%							8
8.00-9.00	16/U76																	
9.00-9.45	17/DS	12	9	10	9	10	38				9-10.00 100%							9
8.00-9.00	18/U76																	
10.00-10.45	19/DS	13	10	10	8	10	38							**10.00**		**TILL - DIAMICTON**		10

Casing Record			Chiselling record			Water level Observations (depths in metres below GL)							
Date	Diam' (mm)	Depth	Time	From (m)	To (m)	Date	Time	strike	Water level (after 20min)	Flow	Casing level	Standing	Remarks
						18.01.22		dry				dry	

Key

U	Undisturbed Sample	SPT/S	Split Spoon
B	Bulk sample	SPT/C	Solid Cone
D	Disturbed Sample	HSV	Hand Shear Vane
W	Water Sample	Hand pen'	Hand penetrometer
E	Environmental Glass Jar/Plastic tub	▽	Groundwater strike
PID	Photo-ionisation Detector	▼	Groundwater standing

REMARKS

Weather: Cold and dry

Logged by:	SD
Date:	18.01.22
Checked by	JM
Date:	07.02.22
Approved by	MPB
Date	08.02.22

For explanation of symbols and abbreviations see preface to Borehole records. All depths in metres. Logged in accordance with BS5930:2015

Scale : 1:60

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton OX13 6DD
Tel 01865 326011

BOREHOLE LOG

Report No. S.5848

Figure 2

GROUND INVESTIGATION SERVICES (SOUTHERN) LTD

Date	Borehole No.
February 2022	**Two**

CLIENT	Ground Level (m OD)	Co-ordinates	Sheet 1 of 1
David Beattie			

SITE LOCATION	Boring Method:	Diameter of (*casings*) and bore:	Report No.
Gracelands, The Barracks, Hillesden MK18 4DD	Windowless Sampling	96,101 & 116	**S.5848**

SAMPLES AND TESTS											Windowless Sample Recovery	Water depth	Reduced Level	Depth (thickness)	Legend	Strata Description	Backfill/ Installation	Depth
Depth	Type	SPT records energy ratio = 58.3%					'N' Value	PID	Hand pen'									
metres	& No.	150mm	75mm	75mm	75mm	75mm		ppm	kN/m2			m	m (AOD)	metres				
											GL-1.00 90%					Grass over dark brown humic clayey sand with some gravel sized brick and glass and fine roots	ARISINGS	
														0.35				
														(0.85)		Loose gravel sized brick with some cobble sized brick		
1.20-1.65	1/DS	2	1	1	2	2	6				1.00-2.00 100%							1
1.20-2.00	2/U116															**MADE GROUND**		
														1.20		Firm light grey mottled grey intact CLAY		
														(0.60)				
														1.80		Firm to stiff grey mottled olive brown intact CLAY		
2.00-2.45	3/DS	2	2	3	3	4	12				2.00-3.00 100%							2
2.00-3.00	4/U101													(0.80)				
														2.60		Stiff grey mottled olive brown intact CLAY with selenite crystals		
														(0.40)				
3.00-3.45	5/DS	4	4	5	6	7	22							**3.00**		**TILL - DIAMICTON**		3
																		4
																		5
																		6
																		7
																		8
																		9
																		10

Casing Record			Chiselling record			Water level Observations (depths in metres below GL)							
Date	Diam' (mm)	Depth	Time	From (m)	To (m)	Date	Time	strike	Water level (after 20min)	Flow	Casing level	Standing	Remarks
						18.01.22		dry				dry	

Key

U	Undisturbed Sample	SPT/S	Split Spoon
B	Bulk sample	SPT/C	Solid Cone
D	Disturbed Sample	HSV	Hand Shear Vane
W	Water Sample	Hand pen'	Hand penetrometer
E	Environmental Glass Jar/Plastic tub	▽	Groundwater strike
PID	Photo-ionisation Detector	▼	Groundwater standing

REMARKS

Weather: Cold and dry

Logged by:	SD
Date:	18.01.22
Checked by	JM
Date:	07.02.22
Approved by	MPB
Date	08.02.22

For explanation of symbols and abbreviations see preface to Borehole records. All depths in metres. Logged in accordance with BS5930:2015

Scale : 1:60

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton OX13 6DD
Tel 01865 326011

BOREHOLE LOG

Report No. S.5848

Figure 3

GROUND INVESTIGATION SERVICES (Southern) Ltd

40 Home Close, Wootton, Abingdon, Oxon OX13 6DD Tel 01865 326011

CLIENT

David Beattie

SITE LOCATION

Gracelands, The Barracks, Hillesden MK18 4DD

Date: February 2022

Ground Level :

Orientation: East-west

Co-Ordinates (NGR):

TRIAL PIT

SA1

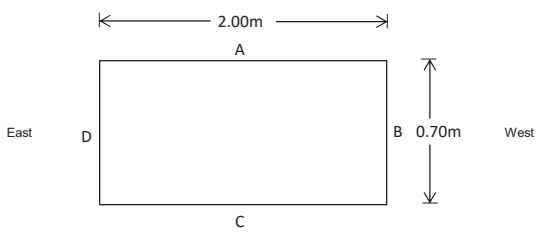
Sheet 1 of 1

Report No.

S.5848

SAMPLES AND TESTS						water	Reduced	Depth	Legend	STRATA AND DESCRIPTION
Depth metres	No.	Type	PID % v/v	Hand pen' kN/m2	HSV kN/m2	depth m	Level m (AOD)	(thickness) metres		
								0.10		Soft dark brown clayey humic SAND (Topsoil)
								(0.40)		Loose light brown very clayey SAND with much gravel and cobble sized brick, concrete and general stone
0.50		D						**0.50**		**MADE GROUND**
								(0.10)		Firm light brown mottled light grey intact CLAY with some fine medium coarse rounded gravel and occasional sand pockets
								0.60		**TILL - DIAMICTON**

Trial Pit Dimensions



Date of logging:	17 January 2022
Excavation plant:	5T excavator
Pit stability:	Stable
Weather:	Cold dry and sunny
Groundwater (strike):	Dry
Groundwater (standing):	dry
Logged by	MPB
Checked by	SD

General Remarks:

Infiltration test conducted in pit to BRE DG365 'Soakaway Design'

Scale 1:30

For explanation of symbols and abbreviations see preface to Borehole records. All depths in metres. Logged in accordance with BS5930:2015:+A1:2020

GROUND INVESTIGATION SERVICES (Southern) Ltd

40 Home Close, Wootton, Abingdon, Oxon OX13 6DD Tel 01865 326011

CLIENT

David Beattie

SITE LOCATION

Gracelands, The Barracks, Hillesden MK18 4DD

Date: February 2022

Ground Level :

Orientation: East-west

Co-Ordinates (NGR):

TRIAL PIT

SA2

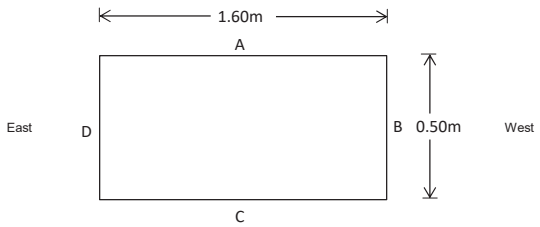
Sheet 1 of 1

Report No.

S.5848

SAMPLES AND TESTS						water	Reduced	Depth	Legend	STRATA AND DESCRIPTION
Depth metres	No.	Type	PID % v/v	Hand pen' kN/m2	HSV kN/m2	depth m	Level m (AOD)	(thickness) metres		
								0.25		Grass over dark brown clayey fine humic SAND with some roots **TOPSOIL**
0.50		D						(0.55)		Soft light brown mottled orange moist slightly sandy intact CLAY with a little fine medium rounded gravel
								0.80		
								(0.20)		Firm brown mottled grey intact CLAY **TILL - DIAMICTON**
1.00		D						**1.00**		

Trial Pit Dimensions



Date of logging:	17 January 2022
Excavation plant:	5T excavator
Pit stability:	Stable
Weather:	Cold dry and sunny
Groundwater (strike):	Dry
Groundwater (standing):	dry
Logged by	MPB
Checked by	SD

General Remarks:

Infiltration test conducted in pit to BRE DG365 'Soakaway Design'

Scale 1:30

For explanation of symbols and abbreviations see preface to Borehole records. All depths in metres. Logged in accordance with BS5930:2015:+A1:2020

GROUND INVESTIGATION SERVICES (Southern) Ltd

40 Home Close, Wootton, Abingdon, Oxon OX13 6DD Tel 01865 326011

CLIENT

David Beattie

SITE LOCATION

Gracelands, The Barracks, Hillesden MK18 4DD

Date: February 2022

Ground Level :

Orientation: East-west

Co-Ordinates (NGR):

TRIAL PIT

SA3

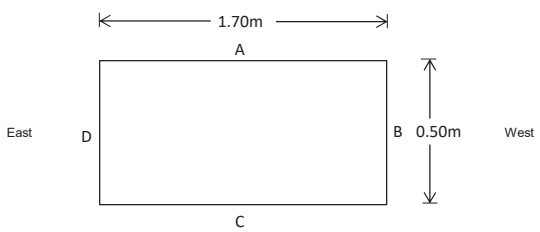
Sheet 1 of 1

Report No.

S.5848

SAMPLES AND TESTS						water depth	Reduced Level	Depth (thickness)	Legend	STRATA AND DESCRIPTION
Depth metres	No.	Type	PID % v/v	Hand pen' kN/m2	HSV kN/m2	m	m (AOD)	metres		
								0.45		Loose dark brown humic silty SAND with much gravel sized general stone and brick and fine to coarse roots **MADE GROUND**
0.50		D						(0.35)		Loose orange brown slightly clayey SAND with a little fine medium white flint gravel
								0.80		Firm to stiff grey mottled bluish grey intact CLAY
1.00		D						(0.70)		
1.50		D						1.50		**TILL - DIAMICTON**

Trial Pit Dimensions



Date of logging:	17 January 2022
Excavation plant:	5T excavator
Pit stability:	Stable
Weather:	Cold dry and sunny
Groundwater (strike):	Dry
Groundwater (standing):	dry
Logged by	MPB
Checked by	SD

General Remarks:

Infiltration test conducted in pit to BRE DG365 'Soakaway Design'

Scale 1:30

For explanation of symbols and abbreviations see preface to Borehole records. All depths in metres. Logged in accordance with BS5930:2015:+A1:2020

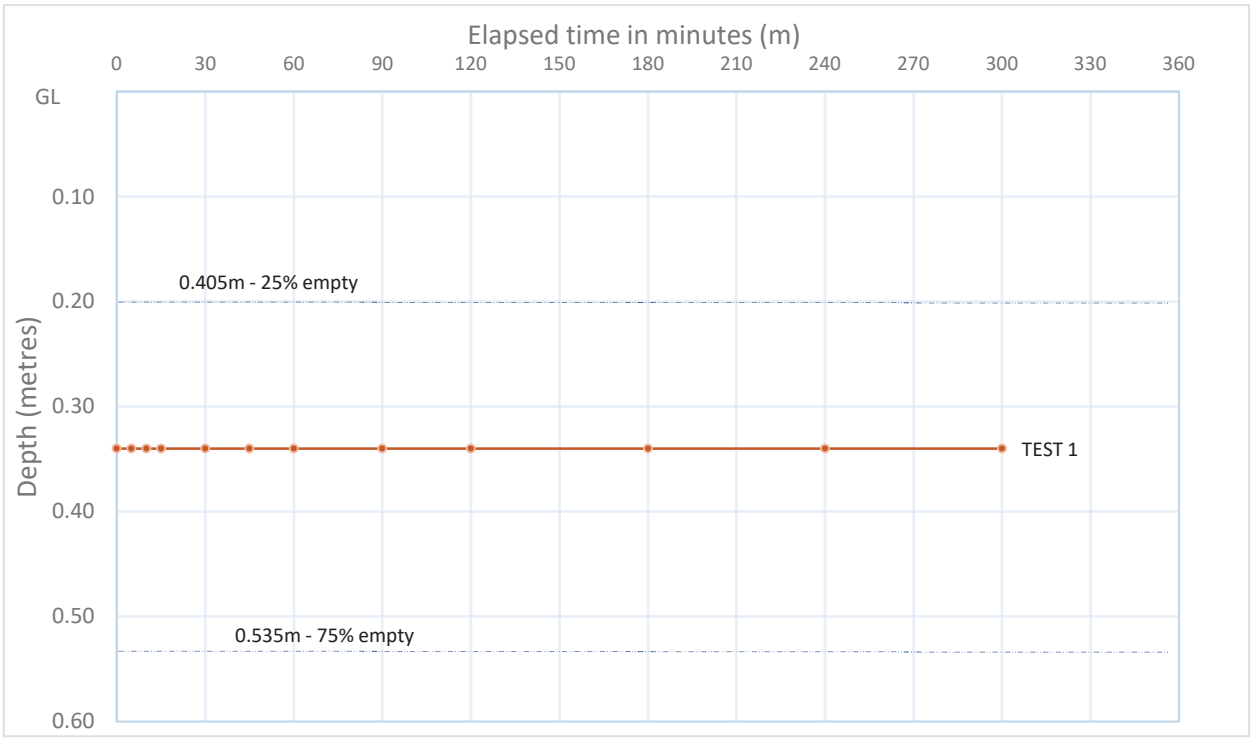
CALCULATION OF SOIL INFILTRATION RATE

Elapsed time in minutes	Depth to water (m) Test 1	Test 2	Test 3
0	0.34		
5	0.34		
10	0.34		
15	0.34		
30	0.34		
45	0.34		
60	0.34		
90	0.34		
120	0.34		
180	0.34		
240	0.34		
300	0.34		

TRIAL PIT	**SA1**	Logged by:	S Dodd
Test No.	1	Checked by:	M Boughton
Groundwater Strike:	dry	Date of test	17 January 2022
Standing:	dry		
Weather	Cold and dry		

Soakage Trial Pit Width W_t (m) =	**0.70**
Soakage Trial Pit Length L_t (m) =	**2.00**
Total Depth from ground level D_{tb} (m) =	**0.60**
Internal Surface Area of trial pit a_{p50} (m) =	**n/a**
Storage Volume between 75-25% V_p (m) =	**n/a**
Time for water to fall from 75-25% t_p (minutes) =	**#DIV/0!**
Allowance for infiltration through soakaway base	NO/~~YES~~
Free volume in aggregate (%) =	**100**

SOIL INFILTRATION RATE (f) = N/a



COMMENTS:

CLIENT: **David Beattie**

SITE : **Gracelands, The Barracks, Hillesden MK18 4DD**

Date: **February 2022**

BRE DIGEST DG365: 2016

SOAKAWAY DESIGN

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton, Abingdon OX13 6DD
Tel 01865 326011

INFILTRATION TEST DATA

Report No. S.5848

Fig. 7

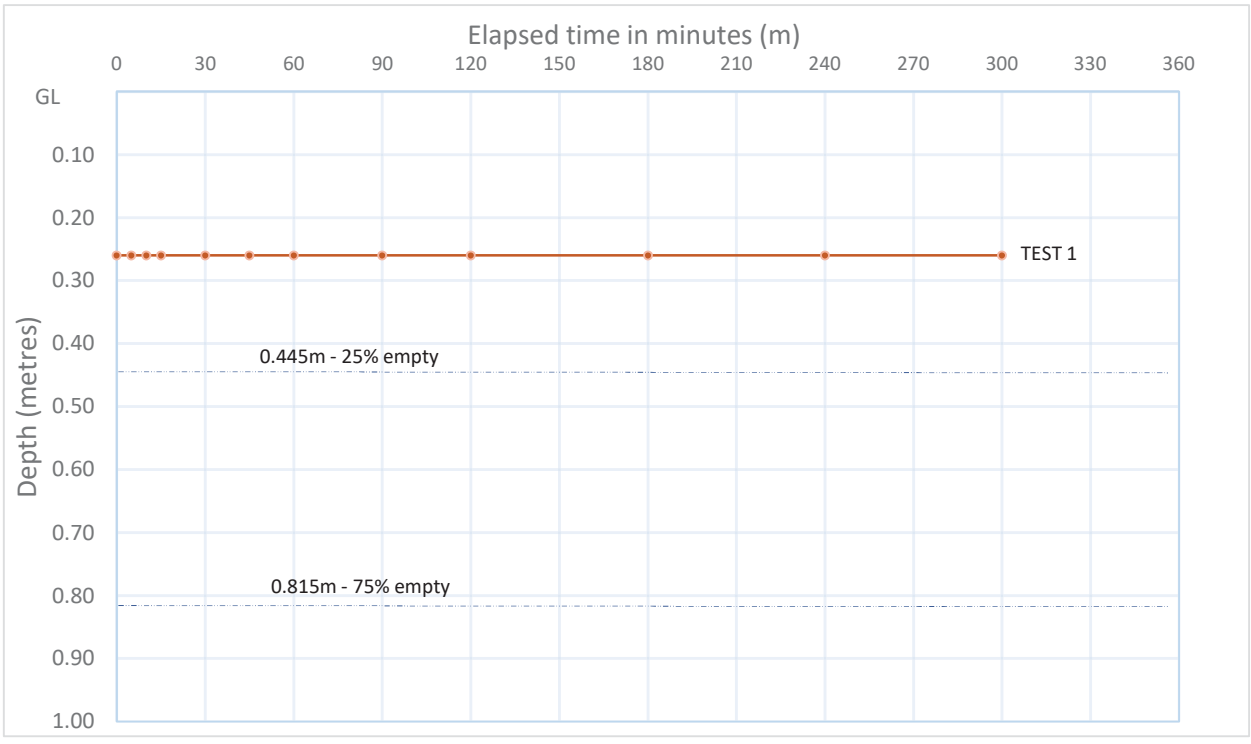
CALCULATION OF SOIL INFILTRATION RATE

Elapsed time in minutes	Depth to water (m) Test 1	Test 2	Test 3
0	0.26		
5	0.26		
10	0.26		
15	0.26		
30	0.26		
45	0.26		
60	0.26		
90	0.26		
120	0.26		
180	0.26		
240	0.26		
300	0.26		

TRIAL PIT	**SA2**	Logged by:	S Dodd
Test No.	1	Checked by:	M Boughton
Groundwater Strike:	dry	Date of test	17 January 2022
Standing:	dry		
Weather	Cold and dry		

Soakage Trial Pit Width W_t (m) =	**0.70**
Soakage Trial Pit Length L_t (m) =	**1.60**
Total Depth from ground level D_{tb} (m) =	**1.00**
Internal Surface Area of trial pit a_{p50} (m) =	**n/a**
Storage Volume between 75-25% V_p (m) =	**n/a**
Time for water to fall from 75-25% t_p (minutes) =	**#DIV/0!**
Allowance for infiltration through soakaway base	NO/~~YES~~
Free volume in aggregate (%) =	**100**

SOIL INFILTRATION RATE (f) = N/a



COMMENTS:

CLIENT: **David Beattie**

SITE : **Gracelands, The Barracks, Hillesden MK18 4DD**

Date: **February 2022**

BRE DIGEST DG365: 2016

SOAKAWAY DESIGN

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton, Abingdon OX13 6DD
Tel 01865 326011

INFILTRATION TEST DATA

Report No. S.5848

Fig. 8

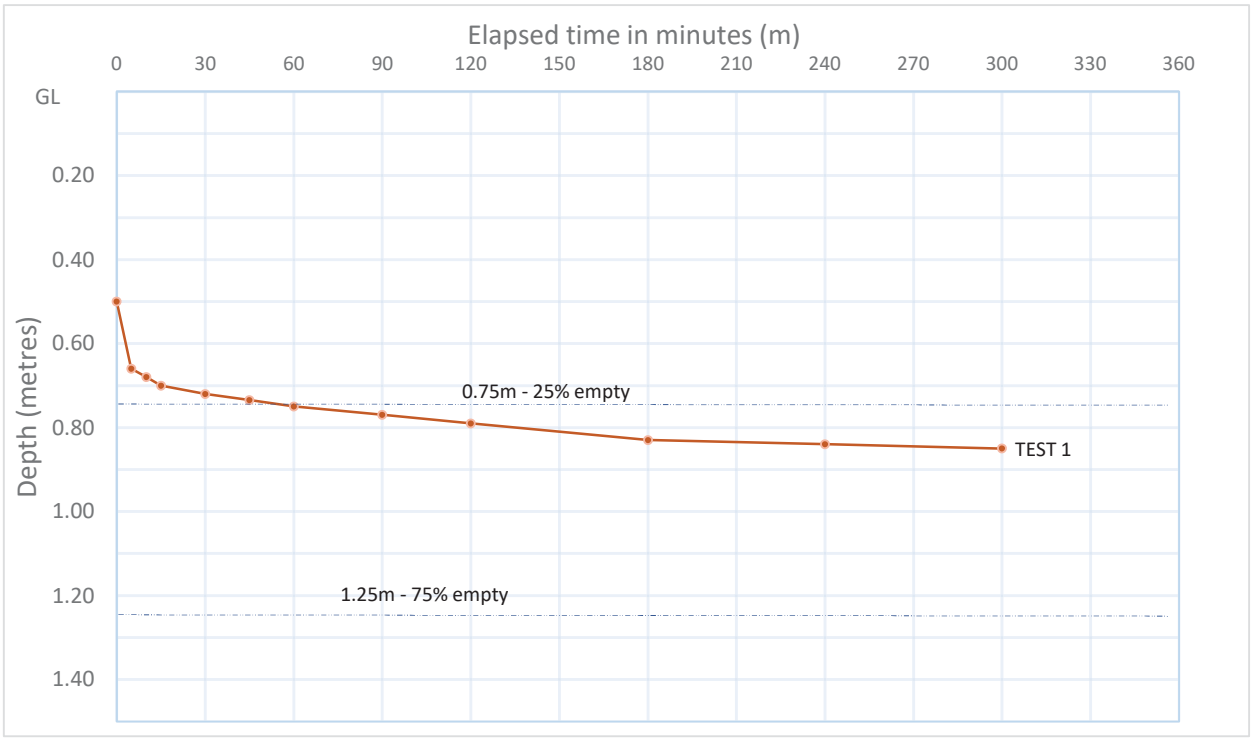
CALCULATION OF SOIL INFILTRATION RATE

Elapsed time in minutes	Depth to water (m) Test 1	Test 2	Test 3
0	0.50		
5	0.66		
10	0.68		
15	0.70		
30	0.72		
45	0.74		
60	0.75		
90	0.77		
120	0.79		
180	0.83		
240	0.84		
300	0.85		

TRIAL PIT	**SA3**	Logged by:	S Dodd
Test No.	1	Checked by:	M Boughton
Groundwater Strike:	dry	Date of test	17 January 2022
Standing:	dry		
Weather	Cold and dry		

Soakage Trial Pit Width W_t (m) =	**0.50**
Soakage Trial Pit Length L_t (m) =	**1.70**
Total Depth from ground level D_{tb} (m) =	**1.00**
Internal Surface Area of trial pit a_{p50} (m) =	**n/a**
Storage Volume between 75-25% V_p (m) =	**n/a**
Time for water to fall from 75-25% t_p (minutes) =	**#DIV/0!**
Allowance for infiltration through soakaway base	NO/~~YES~~
Free volume in aggregate (%) =	**100**

SOIL INFILTRATION RATE (f) = N/a



COMMENTS:

CLIENT: **David Beattie**

SITE : **Gracelands, The Barracks, Hillesden MK18 4DD**

Date: **February 2022**

BRE DIGEST DG365: 2016

SOAKAWAY DESIGN

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton, Abingdon OX13 6DD
Tel 01865 326011

INFILTRATION TEST DATA

Report No. S.5848

Fig. 9

Ref No.	Sample No.	Sample Depth m	Moisture content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	Plasticity Index (Adjusted) %	Mass Passing 425µm %	Shrinkage potential NHBC Guidelines	Classification BS 1377-Part 2: 1990	Sample Description
BH1	1	0.50	32	73	29	44	44	100	H	CV	Clay
	1	1.00	29	73	27	46	46	100	H	CV	Clay
	3	2.00	29	75	28	47	48	100	H	CV	Clay
	5	3.00	25	63	25	38	38	100	M	CH	Clay
BH2	2	2.00	29	72	27	45	45	100	H	CV	Clay
	3	3.00	32	74	29	45	45	100	H	CV	Clay

REMARKS:

12 Desiccated in accordance with BRE Digest 412 *desiccation in clay soils*

CL	Inorganic CLAY low plasticity	ML	Inorganic SILT low compressibility
CI	Inorganic CLAY medium plasticity	MI	Inorganic SILT medium compressibility
CH	Inorganic CLAY high plasticity	MH	Inorganic SILT high compressibility
CV	Inorganic CLAY very high plasticity	MV	Inorganic SILT very high compressibility
CE	Inorganic CLAY extremely high plasticity	ME	Inorganic SILT extremely high compressibility
N	Non shrinkage Potential	(O)	Organic matter
L	Low shrinkage Potential		
M	Medium shrinkage Potential		
H	High shrinkage Potential		

CLIENT: **David Beattie**

SITE: **Gracelands, The Barracks, Hillesden MK18 4DD**

DATE: **February 2022**

(BS EN ISO 17892-12 : Clauses 5.3 and 5.5 : 2018)

Natural water content

Liquid limit - cone penetrometer method (definitive method)

Plastic limit and plasticity index

Checked by

Approved by

Ground Investigation Services (Southern) Ltd
40 Home Close, Wootton OX13 6DD
Tel 01865 326011

INDEX PROPERTIES

Report No. S.5848

Table B1

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www.element.com

Ground Investigation Services
40 Home Close
Wooton
Oxon
OX13 6DD

Attention :	Martyn Boughton
Date :	8th February, 2022
Your reference :	
Our reference :	Test Report 22/1354 Batch 1
Location :	Gracelands The Barracks Hillesden
Date samples received :	28th January, 2022
Status :	Final Report
Issue :	1

Six samples were received for analysis on 28th January, 2022 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigation Services
Reference:
Location: Gracelands The Barracks Hillesden
Contact: Martyn Boughton
EMT Job No: 22/1354

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1	2	3	4	5	6					LOD/LOR	Units	Method No.
Sample ID	BH1	BH1	BH1	BH1	BH2	BH2							
Depth	0.50	2.00	3.00	8.00	2.00	3.00							
COC No / misc													
Containers	T	T	T	T	T	T							
Sample Date	26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	28/01/2022	28/01/2022	28/01/2022	28/01/2022	28/01/2022	28/01/2022							
Sulphur as S	0.03	0.09	0.16	0.96	0.04	1.72					<0.01	%	TM30/PM15
Total Sulphate as SO4 BRE	0.05	0.20	0.37	0.24	0.08	5.59$_{AA}$					<0.01	%	TM50/PM29
Sulphate as SO4 (2:1 Ext) #	NDP	0.8770	1.7513	0.1831	0.2542	1.8613					<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	0.0795	-	-	-	-	-					<0.0015	g/l	TM38/PM60
pH #	8.08	8.00	7.58	7.89	8.12	7.46					<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigation Services

Matrix : Solid

Reference:

Location: Gracelands The Barracks Hillesden

Contact: Martyn Boughton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
22/1354	1	BH1	0.50	1	TM38/PM20	Sample too absorbent for this test

Client Name: Ground Investigation Services
Reference:
Location: Gracelands The Barracks Hillesden
Contact: Martyn Boughton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 22/1354						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 22/1354

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x10 Dilution

EMT Job No: 22/1354

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No