Glebe House
Upper West Lane
North Lancing
West Sussex

Geotechnical Assessment Report

Report Beneficiary:
Andrew O'Donnell
108 West Way
Lancing
West Sussex
BN15 8NB

Project Reference: P16687

Report Reference: R16270

Document Control			
Issue No.	**Status**	**Issue Date**	**Notes**
1	Final	24th July 2024	

Report Section	Prepared By	Approved By
Factual Section	Georgia Roper-Docherty BSc MRes	Steven McSwiney BA mod Geol MSc FGS
Geotechnical Assessment	Adam Cormack HNC FGS	Steven McSwiney BA mod Geol MSc FGS

Head Office
Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
Tel: 01273 483119
www.ashdownsi.co.uk

Limitations

This report was prepared specifically for the Client's project and may not be appropriate to alternative schemes. The copyright for the report and licence for its use shall remain vested in Ashdown Site Investigation Limited (the Company) who disclaim all responsibility or liability (whether at common law or under the express or implied terms of the Contract between the Company and the Client) for any loss or damage of whatever nature in the event that this report is relied on by a third party, or is issued in circumstances or for projects for which it was not originally commissioned.

EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

It is understood that a replacement part one, part two-storey dwelling is to be constructed at Glebe House, North Lancing, West Sussex following the demolition of the existing building.

Reference to geological datasets indicates that the site is expected to be underlain by Head deposits overlying the White Chalk Subgroup. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying Head deposits.

The Head deposits are classed as a Secondary A Aquifer. The White Chalk Subgroup is classed as a Principal Aquifer. The site does not lie within a SPZ. Groundwater was not encountered during the course of the investigation.

Precautions against shrinkage and heave for any new foundation system should assume a medium volume change potential for the fine-grained Head soils.

A net allowable bearing capacity of 150kN/m^2 may be assumed for spread (pad or strip) foundations up to 1.00m across bearing within Head soils of at least stiff consistency.

Preliminary indicative pile capacities are included in the body of the report.

It is recommended that ground floors should be suspended.

A DS-1 Design Sulfate Class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

TABLE OF CONTENTS

1.	**INTRODUCTION**	**1**
2.	**SITE CONTEXT**	**2**
2.1	Site Location	2
2.2	Geological Setting	2
3.	**SITE WORKS**	**4**
3.1	Introduction	4
3.2	Exploratory Holes	4
3.3	Sampling	4
3.4	In Situ Strength Testing	4
3.5	Laboratory Testing	4
4.	**GROUND CONDITIONS**	**5**
4.1	Stratigraphy	5
4.2	Stability	5
4.3	Groundwater Conditions	5
4.4	Existing Foundations	5
5.	**GEOTECHNICAL ASSESSMENT**	**6**
5.1	Foundations	6
5.2	Ground Floors	9
5.3	Groundwater	10
5.4	Stability of Excavations	10
5.5	Aggressivity to Concrete	10

FIGURES AND APPENDICES

FIGURES

Figure 1 Site Location Plan
Figure 2 Site Plan
Figure 3 Foundation Details

APPENDIX A

Proposed Development Layout

APPENDIX B

Explanatory Notes
Exploratory Hole Records
DPSH-B Dynamic Probe Records

APPENDIX C

Geotechnical Laboratory Test Results

1. INTRODUCTION

It is understood that a replacement part one, part two-storey dwelling is to be constructed at Glebe House, North Lancing, West Sussex following the demolition of the existing building. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Ltd was requested to undertake a ground investigation and to provide advice to assist with the structural design.

The specific objectives of the works were to:
a) Establish the expected geology and hydrogeology at the site;
b) Investigate the ground and groundwater conditions broadly in the specified locations;
c) Investigate the form of foundations to existing structures; and
d) Provide advice to assist others in undertaking design of foundations and ground floors.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q14232, dated 18th June, 2024. The instruction to proceed was received on behalf of the client, Andrew O'Donnell.

2. SITE CONTEXT

2.1 Site Location

The site is located at Upper West Lane, North Lancing, West Sussex and is centred on the approximate Ordnance Survey national grid reference 518177, 105507. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

2.2 Geological Setting

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	Head	Secondary A Aquifer
Bedrock	White Chalk Subgroup	Principal Aquifer

The superficial Head is a polymict deposit generally comprising clay and sandy clay with variable amounts of gravel and cobbles. The lithology of the Head reflects the nature of the parent solid strata; the gravel and cobble fraction comprising chalk and flint. The material is likely to have been disturbed by intense frost action in a periglacial environment. It is usually poorly sorted but may be stratified where it has been subject to solifluction and/or hillwash and soil creep. It may form infill to solution features within the chalk.

The White Chalk Subgroup comprises chalk with flints. The Subgroup contains discrete marl seams, nodular chalk and flint seams throughout. The formation is of Maastrichtian to Cenomanian age (66 to 100.5 million years old; Late Cretaceous). The subgroup is recorded by the BGS to range in thickness up to 470 to 515m are preserved in the Hampshire/Sussex Area.

2.2.2 Natural Ground Subsidence

The chalk can be expected to have a deeply convoluted upper surface as a result of solution weathering and erosion. The presence of natural cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary Superficial Deposits. The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

The British Geological Survey GeoSure 5km hex grid indicates the generalised area of the site has a significant susceptibility from soluble rocks.

Further assessment of the natural ground hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.3 Historical Mining

Historically, chalk deposits were often mined locally. Most commonly historical mines characteristically comprise a narrow shaft with a number of chambers radiating from the base. These structures are colloquially known as "deneholes", "chalk-wells" or "chalkangles".

The depth of the features reflects the depth to the underlying chalk bedrock. The shaft width was commonly in the order of 2m to 3m, widening out into galleries at depth. The chalk was extracted for soil improvement and was usually applied directly to fields though sometimes the chalk was processed, typically by burning in kilns where the chalk was used to produce quicklime (calcium oxide).

Once they had reached their limits the mines were commonly capped. Various capping techniques were used; examples include the use of upturned trees or brick arching. Records pertaining to the distribution of these localised mines are incomplete, usually being limited to features marked as shafts or the occurrence of circular depressions on historic Ordnance Survey maps. In the field they are most likely to be visible as shallow depressions, if at all.

The British Geological Survey GeoIndex Onshore viewer does not record any mines within 1km of the site. The closest surface chalk extractions (chalk pits) are recorded some 600m to the north-west of the site. A search of the Chelsea Speleological Society records revealed no records of mines within 1km of the site. The risk posed to the development by historical mines is considered to be negligible to very low.

Further assessment of the mining hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.4 Groundwater Source Protection Zones (SPZ)

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

3. SITE WORKS

3.1 Introduction

The intrusive site works comprised two dynamic sampler boreholes and a single foundation inspection pit, together with accompanying in-situ geotechnical testing. The intrusive work was carried out on 27th June 2024. The exploratory hole locations are shown on Figure 2.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix B, together with explanatory notes to assist in their interpretation.

3.2 Exploratory Holes

The following table summarises the intrusive works undertaken at the site.

Table 2. Summary of Intrusive Works Undertaken

Designation	Depth (m bgl)	Method
WS01	6.00	Dynamic Sampler
WS02	6.00	Dynamic Sampler
TP01	1.00	Hand Dug

3.3 Sampling

Samples of soil were taken from the exploratory holes at the depths shown in the exploratory hole records. The types of samples taken are indicated on the exploratory hole records. Details on the sample types are provided in the explanatory notes.

3.4 In Situ Strength Testing

The types and depths of in situ testing, together with the test results, are either given on the exploratory hole records or are summarised separately in Appendix B. Further details on the in situ testing methods are provided in the explanatory notes.

3.5 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd. Results from the laboratory tests are provided in Appendix C.

Geotechnical testing was undertaken by Ashdown Site Investigation Ltd. Chemical testing was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 Surface Covering

Exploratory holes WS01 and TP01 were excavated through a surface cover of concrete some 250mm in thickness.

Borehole WS02 was excavated through a surface covering of topsoil some 150mm thick.

4.1.2 Made Ground

Made ground, generally comprising gravelly silty clay, was recorded to the full depth of trial pit TP01 (1.00m) and to depths of 1.10m and 0.70m below ground level within boreholes WS01 and WS02, respectively. The gravel fraction comprised variable quantities of flint, chalk, brick, sandstone, ironstone, charcoal-like material and concrete.

4.1.3 Head

Underlying the made ground, where penetrated, the boreholes progressed into undisturbed generally stiff gravelly silty clay, locally with bands of very clayey gravel and very sandy clays/very clayey sands at depth. The gravel fraction within these deposits consisted of flint and occasional chalk.

These deposits continued to the full depth of the investigation and are considered to represent the Head deposits indicated to underlie the site on BGS geological maps.

4.2 Stability

Boreholes WS01 and WS02 recorded instability, likely associated with the coarser grained soils, and collapsed to respective depths of 5.75m and 5.50m below ground level.

4.3 Groundwater Conditions

Groundwater was not encountered during the course of the investigation.

4.4 Existing Foundations

Details of the foundations exposed within the foundation inspection pits are included as Figure 3 of this report.

5. GEOTECHNICAL ASSESSMENT

The geotechnical assessment has been prepared in connection with the development proposals shown on the drawing included in Appendix A.

In summary, the proposed development is to comprise demolition of the existing building, and the construction of part one, part two-storey replacement dwelling.

At the time of writing, no details were available concerning the specific loads likely to be applied to the foundations.

5.1 Foundations

5.1.1 Soil Shrinkage/Heave Potential

The fine-grained soils of the Head have been classified as clays, and with modified plasticity indices in the range of 7% to 29%, the soils may be expected to exhibit up to a medium volume change potential.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings, piles, pile caps and ground beams etc.) should assume a medium volume change potential for the fine-grained Head soils and take into account current guidance such as that given by the Building Research Establishment (BRE)[1] or the National House Builders Council (NHBC)[2].

Whilst this report has been prepared to provide advice to assist designers in undertaking detailed design, the report itself does not represent a detailed design statement. Detailed foundation design, including assessment of foundation type, minimum founding depths for spread foundations, requirements for sleeving or reinforcing of piled foundations and requirements for placement of void formers et cetera, should take into account the findings of this report and the presence of trees (previous, present and proposed). In connection with the latter, attention is drawn to the tree survey & report[3] undertaken at the site which should be provided to engineers responsible for the foundation design. Information on proposed planting schemes that may affect foundation design should also be provided.

5.1.2 Spread Foundations

5.1.2.1 Foundation Depths for Spread Foundations

Foundations should be constructed to bear below soils that are likely to be affected by significant soil volume changes caused by seasonal changes in moisture content to avoid damage to foundations that could otherwise arise. In addition, all made ground and any soils disturbed by the construction or removal of any previously existing foundations or services should be regarded as being variable in nature and state of compaction and, as such, unsuitable as a founding medium for shallow footings. New footings should be constructed so as to bear below made ground/disturbed natural soils and soil subject to seasonal soil volume changes, whichever is the deeper, and onto undisturbed, competent, natural deposits.

[1] www.bre.co.uk : BRE Digests 240, 241 and 242, Low rise buildings on shrinkable clay soils, parts 1, 2 and 3; and BRE Digest 298 , The influence of trees on house foundations in clay soils and BRE Digest 412, Desiccation in clay soils.
[2] http://www.nhbc.co.uk/ : NHBC Standards, Chapter 4.2.
[3] Beechdown Arboriculture Ltd Tree survey & Report ref B/0467/23, dated 1st December 2023.

Summary guidance on suitable minimum foundation depths to protect against the effects of seasonal soil volume changes is presented in the table below but designers undertaking detailed design of foundations should follow the detailed guidance such as that provided within Chapter 4.2 of the NHBC Standards.

Table 3. Indicative Minimum Foundation Depths

Tree Type	Water Demand of Tree	Tree Distance to Tree Height Ratio (D/H)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.25
		Minimum Foundation Depth Required in Medium Volume Change Potential Soils (m)									
Broad Leaf	High	†			2.50	2.35	2.20	2.00	1.70	1.35	0.90*
	Moderate	2.00	1.85	1.70	1.60	1.45	1.30	1.15	0.90*	0.90*	0.90*
	Low	1.50	1.40	1.30	1.15	1.05	0.90*	0.90*	0.90*	0.90*	0.90*
Coniferous	High	†		2.30	1.95	1.60	1.25	0.90*	0.90*	0.90*	0.90*
	Moderate	2.00	1.70	1.40	1.10	0.90*	0.90*	0.90	0.90*	0.90*	0.90*

* Minimum foundation depth required to protect against soil volume changes.
† Foundations deeper than 2.50m require specialist design to protect against soil volume changes.

Details on the water demand and mature height of common trees is given within Table 3 of Chapter 4.2 of the NHBC standards which should be referred to when assessing minimum foundation depths required for the proposed development. A summary is provided in the table below.

Table 4. Indicative Summary of Water Demand and Mature Height of Common Trees

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
Broad Leaf	Elm	18 – 24*	Acacia	18	Birch	14
	Oak	16 – 24*	Alder	18	Elder	10
	Poplar	15 – 28*	Apple	10	Fig	8
	Willow	16 – 24*	Ash	11 – 23*	Hazel	8
	Eucalyptus	18	Laurel	10	Holly	12
	Hawthorn	10	Beech	20	Honey Locust	14
			Blackthorn	8	Hornbeam	17
			Cherry	8 – 17*	Laburnum	12
			Chestnut	20 – 24*	Magnolia	9
			Lime	22	Mulberry	9
			Maple	8 – 18*	Tulip Tree	20
			Pear	12		
			Plane	26		
			Plum	10		
			Sycamore	22		
			Tree of Heaven	20		
			Walnut	18		

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
			Whitebeam	12		
Coniferous	Cypress	18 – 20*	Cedar	20		
			Douglas Fir	20		
			Larch	20		
			Monkey Puzzle	18		
			Pine	20		
			Spruce	18		
			Wellingtonia	30		
			Yew	12		

* Dependent on particular species.

5.1.2.2 Bearing Capacity for Spread Foundations

For design purposes, a net allowable bearing capacity of 150kN/m^2 may be assumed for spread (pad or strip) foundations up to 1.00m across bearing within Head soils of at least stiff consistency. The quoted bearing capacities are expected to limit settlement to less than 25mm.

Attention is drawn to the presence of interbedded fine-grained soils and coarse-grained soils beneath the site. As there is the potential for mixed soil conditions to be present beneath footings, designers should consider the need for foundations to be reinforced due to the potential for differential cracking to develop as a result of coarse-grained and fine-grained soils settling at different rates under loading.

Care must be taken to ensure that new foundations do not undermine or impose additional loading (vertical or lateral) on existing foundation/structures. Similarly, the construction of new foundations should be undertaken carefully and monitored in those situations where temporary works could affect existing foundations/structures.

In view of the risk associated with the underlying geology at the site for potential natural ground and mining hazard, it is recommended that as a minimum all stripped formation levels should be inspected by a suitably qualified person for evidence of historical backfilled shafts/chambers and/or dissolution features as a precaution, and the inspections should be appropriately documented.

5.1.3 Piled Foundations

It is understood consideration may need to be given to adopting a piled foundation in order to protect root zones, in particular the mature beech tree located to the east of the proposed dwelling.

It is considered that the Head soil could provide support to piled foundations by a combination of side adhesion (skin friction) and end bearing. Given the limited depth of the boreholes, no information is available in relation to the underlying White Chalk Subgroup. Consideration will need to be given to whether sleeving or reinforcing of piled foundation is required to minimise the risk of damage through soil shrinkage/heave.

The selection of piling techniques should consider access constraints applicable to particular plant and potential vibration effects on existing services, structures and roadways. The method of

installation would also have to accommodate the presence of potential relict structural obstructions and/or naturally occurring hard strata, such as the flint bands that were recorded by the boreholes. In this regard attention is drawn to the no further progress of the dynamic probe carried out adjacent to borehole WS02.

For the purpose of this initial discussion and for reasons given above, consideration has been given to the adoption of bored piles, the use of which would prove beneficial as, this method enables temporary steel casing to be installed to stabilise the pile bore and a range of boring tools, including chisels, can be employed to progress pile bores through difficult ground.

Calculations to determine illustrative working loads for axially loaded piles have been undertaken; each calculation assuming a single pile acting in compression. Indicative capacities are presented in the following table. Available capacities may vary for piles acting in tension.

The soil profile assumed for these calculations has been based on examination of the recovered samples and the results of in-situ and laboratory testing. A modelled ground profile comprising stiff clay has been adopted. Groundwater has been assumed to be present below the length of the piles.

In consideration of the medium volume change potential of the clay soils and the proximity of existing trees, for the purpose of the preliminary calculations the benefit of shaft resistance within the upper 3m has been discounted.

Table 5. Indicative Axially Loaded Pile Working Capacities

Working Loads of Piles (kN)			
Length (m)	**Diameter (mm)**		
	300	**450**	**600**
6*	50	85	125

Notes:
The structural strength of the concrete used in construction may limit the available working loads of the piles. Indicated pile lengths are from existing ground level. A factor of safety of 3.0 has been applied. The benefit of shaft resistance within the upper 3m has been discounted. * Federation of Piling Specialists guidance and BS EN 1997-2-2007 require boreholes and testing to extend to a depth equivalent to the largest of: the pile length plus pile group width, pile length plus 5.0m and pile length plus 3 x pile diameter. Further ground investigation works may be required if piles of this length are proposed.

Working capacities for pile groups should be assessed when final design details are known, although for preliminary design purposes it is likely that piles spaced at least 3 x pile diameter from other piles in any group will behave as single piles.

Where preliminary and working pile load tests are undertaken it may be appropriate to reduce Safety Factors, although 2.5 may be a minimum local authority requirement. Should testing not be undertaken it is suggested that a factor of safety of at least 3.0 should be adopted.

For all piling options it is recommended that the advice of specialist foundation contractors should be sought at the earliest opportunity and that piling specifications should be obtained with reference to their particular products as this may affect the calculated pile capacity.

5.2 Ground Floors

In view of the variable thickness of made ground and the presence of soils of medium volume change potential, it is recommended that ground floors should be suspended.

5.3 Groundwater

Groundwater was not encountered within the exploratory holes at the time of the ground investigation works. It should be noted that water levels within the exploratory holes may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

It is possible that heavy precipitation during construction could lead to the ingress of perched groundwater or surface water run-off into excavations. In such circumstances it would be expected that water entering excavations would be adequately managed by either pumping from sumps or natural drainage, or a combination of the two.

5.4 Stability of Excavations

All made ground or coarse-grained natural soils exposed in excavations should be assumed to be unstable, even in the short term. Whilst fine-grained natural soils may remain stable for a short period of time if not subjected to surcharge loads (such as may be imposed by existing foundations, traffic or storage of materials), the stability of these deposits if left unsupported should be assumed to have the potential to deteriorate. Where stable excavations are required, excavations should either be suitably supported or, where space permits, side slopes could be battered back to a safe angle of repose.

All excavations requiring human entry must be shored or battered as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)[4]. Current legislation requires that where personnel access is required into any excavation a competent person must inspect excavation supports or battering of slopes at the start of the working shift and at other specified times. No work should take place until the excavation is safe. Excavations should also be inspected after any event that may have affected their stability, such as a significant weather event, changes in surcharge loadings imposed by temporary storage of materials or changes in site traffic plans or alteration of support systems. Inspections should be formally recorded and any faults that are found should be corrected immediately.

Particular attention must be paid to ensuring the stability of nearby structures, services and neighbouring sites as well as the road frontages.

5.5 Aggressivity to Concrete

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE[5].

In consideration of the soils encountered beneath the site it is considered that 'natural ground conditions' may be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). Whilst groundwater was not encountered during the short period of the works, in the absence of long-term monitoring data, 'mobile groundwater' conditions should be conservatively assumed.

The following table summarises the characteristic values indicated from the chemical analysis of the soils present beneath the site.

[4] Relevant guidance is given on the HSE website, www.hse.gov.uk
[5] BRE Special Digest 1:2005 Concrete in Aggressive Ground.

Table 6. Assessment of the Chemical Analysis of the Soil

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	8.0	-	-
Water Soluble Sulphate (mg/l as SO4) *	<100	DS-1	AC-1

Notes: * Characteristic value rounded to nearest 100.

In accordance with the guidance, a DS-1 Design Sulfate Class and an AC-1 ACEC classification may be assumed for the design of concrete in contact with the ground.

Ashdown Site Investigation Ltd.

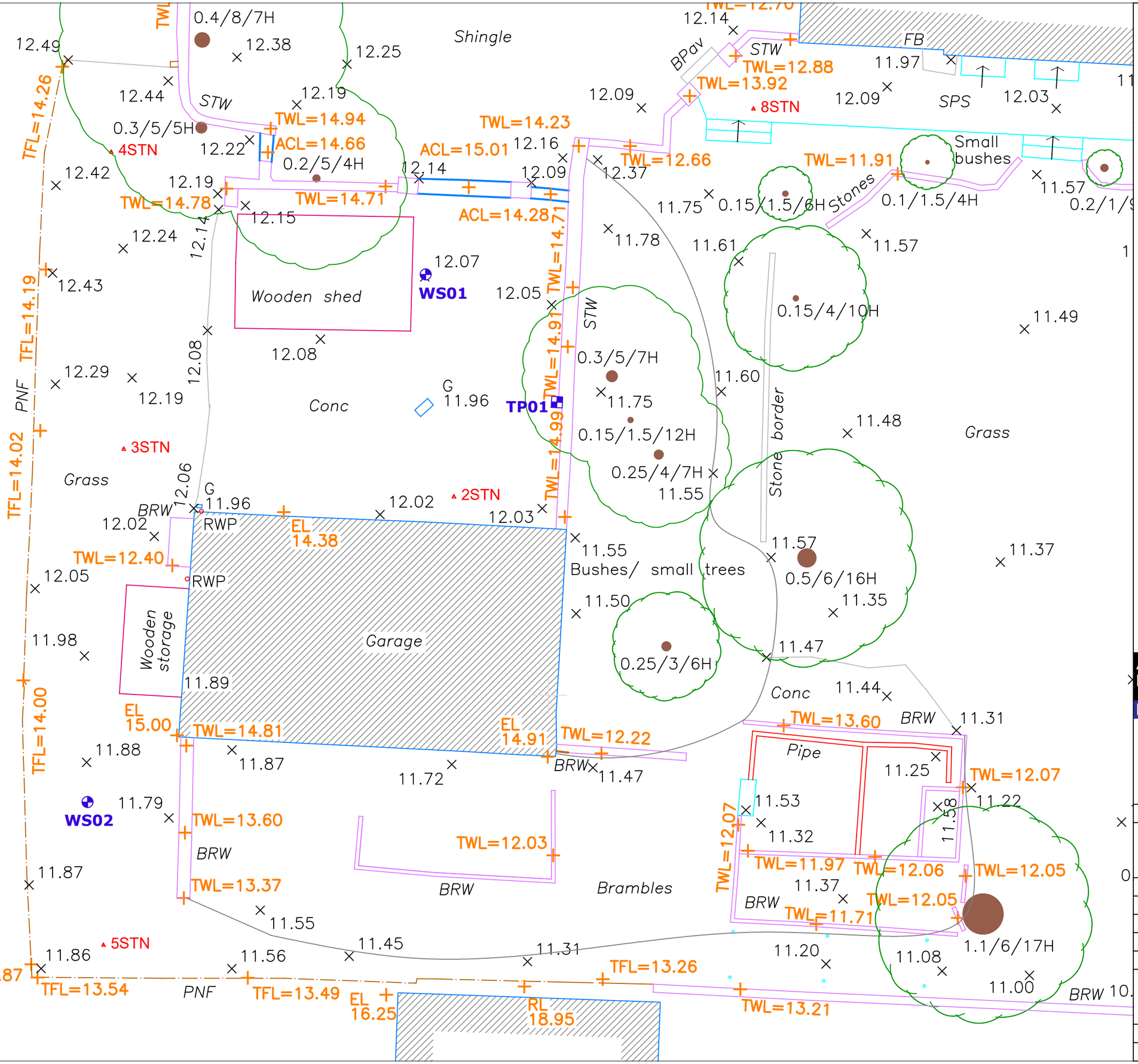
FIGURES

Figure 1 Site Location Plan
Figure 2 Site Plan
Figure 3 Foundation Details



© OpenStreetMap contributors, CC BY-SA

ASHDOWN SITE INVESTIGATION LIMITED	Site Location Plan	Site Name	Figure No.	Project Reference
		Glebe House, Upper West Lane, North Lancing, West Sussex	1	P16687



ASHDOWN SITE INVESTIGATION
L•I•M•I•T•E•D

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:

Glebe House
Upper West Lane
North Lancing
West Sussex

Project Ref:

P16687

Figure No.

2

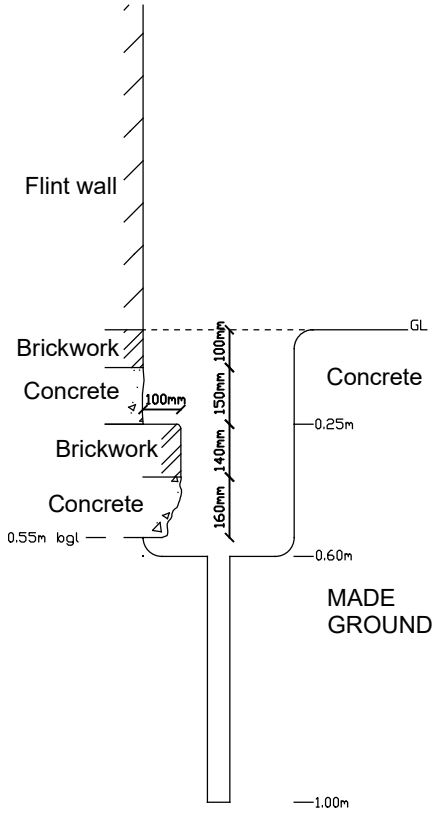
Drawing Title

Site Plan

Scale

1:100

TP01



ASHDOWN SITE INVESTIGATION
L•I•M•I•T•E•D

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:

Glebe House
Upper West Lane
North Lancing
West Sussex

Project Ref:

P16687

Figure No.

3

Drawing Title

Foundation Details

Scale

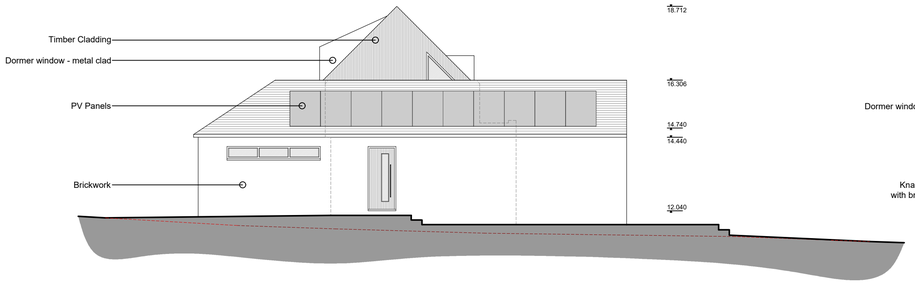
1:20

APPENDIX A

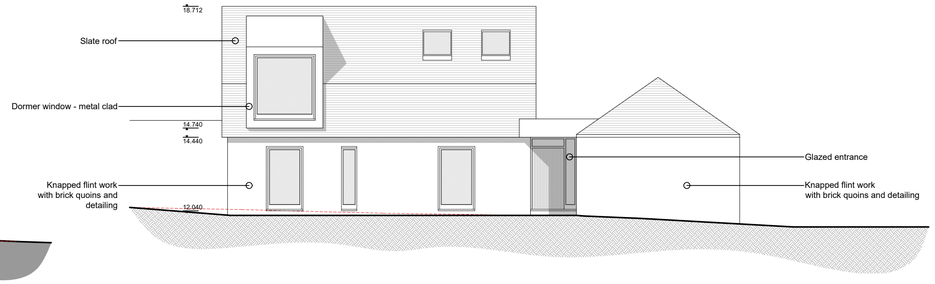
Proposed Development Layout

NOTES

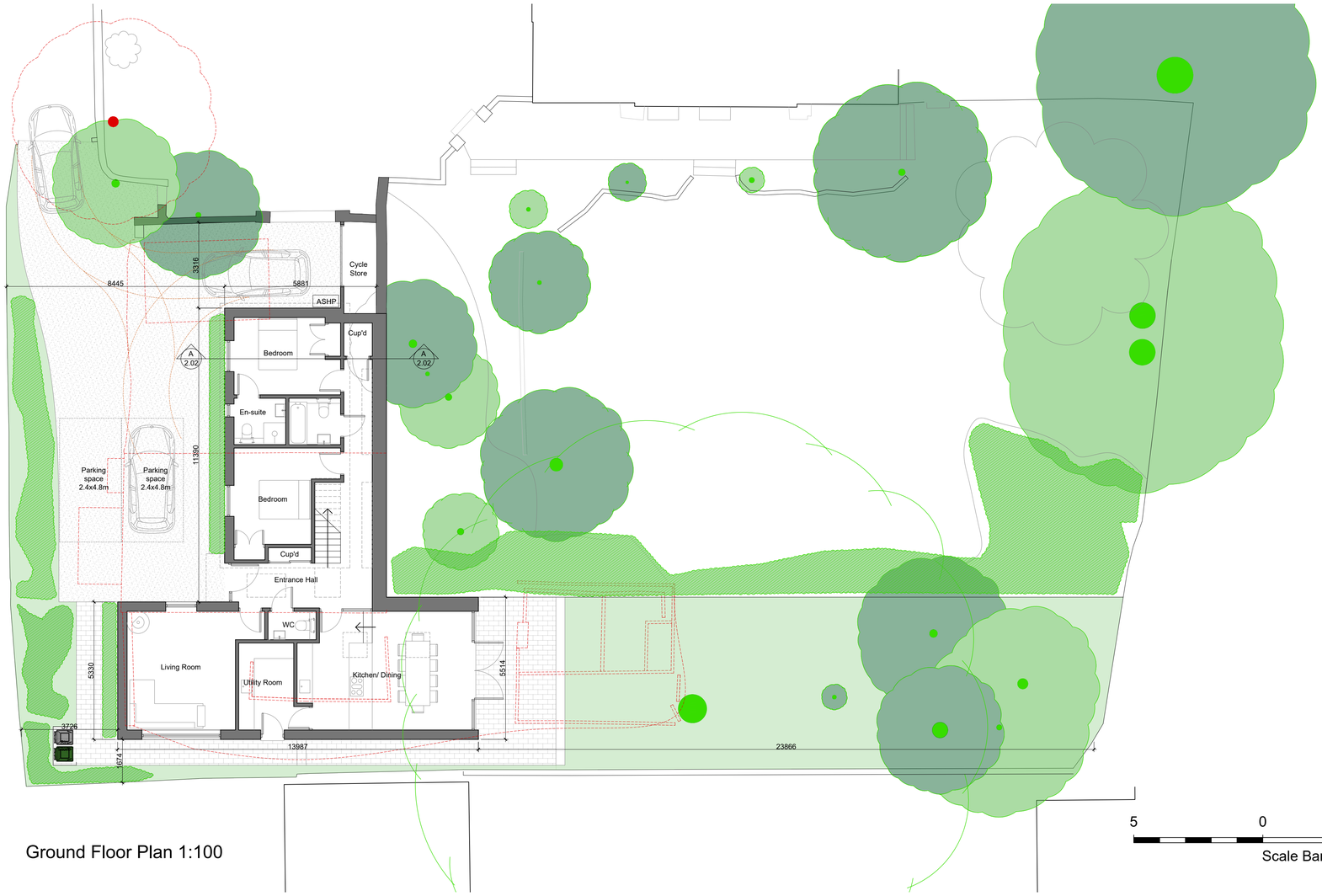
- DO NOT SCALE OFF THIS DRAWING EXCEPT FOR PLANNING PURPOSES
- CHECK ALL DIMENSIONS ON SITE BEFORE ANY WORK IS COMMENCED
- ALL GOODS MATERIALS AND WORKMANSHIP MUST CONFORM WITH CURRENT BUILDING REGULATIONS, BRITISH STANDARDS AND CODES OF PRACTICE
- COPYRIGHT OF THIS DRAWING IS RETAINED BY THE ARCHITECT AND IT MUST NOT BE REPRODUCED WITHOUT WRITTEN CONSENT



South Elevation 1:100



West Elevation 1:100



Ground Floor Plan 1:100

N

5 0 5 10

Scale Bar 1:100

REV	DATE	BY	AMENDMENT
C	19.03.24	BH	ASHP location added
B	08.03.24	BH	Roof amendments - gable to hip
A	02.11.23	BH	Layout amendments

folkes architects
The Old Forge
6 Church Street
Storrington
West Sussex
RH20 4LA
t. 01903 860629
info@folkesarchitects.co.uk

CLIENT
Mr & Mrs O'donnell

JOB TITLE
New Dwelling
Glebe House
Upper West Lane
North Lancing
BN15 0EX

DRAWING TITLE
General Arragement
Plans & Elevations

DRAWING STATUS
PLANNING
NOT FOR CONSTRUCTION USE UNLESS STATED AS 'CONSTRUCTION'

DATE	SCALE	DRAWN BY	CHECKED BY
Sept 2023	1:100@A1	BH	MF

JOB NO.	DRAWING NO.	REVISION
23023	2.02	/

APPENDIX B

Explanatory Notes
Exploratory Hole Records
DPSH-B Dynamic Probe Records

Explanatory Notes

Symbols and abbreviations on Exploratory Hole Records

Samples

U 'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
Pi Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
D Disturbed Sample
R Root Sample
B Bulk Disturbed Sample
W Water Sample
ES Environmental Suite (on older records may be referenced J T)

In Situ Testing

S Standard penetration test (SPT): Using the split spoon sampler.
C Standard Penetration Test (SPT): Using a solid cone instead of the sampler – conducted usually in coarse grained soils or weak rocks.
V Shear Vane Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.
H Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.
P Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

CP Cable Percussion Borehole
RC Rotary Cored Borehole
WLS Dynamic Sampler Borehole using windowless sampler tubes
WS Dynamic Sampler Borehole using window sampler tubes
TP Trial Pit excavated using mechanic excavator
HDP Trial Pit excavated using hand tools

Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

In Situ Strength Testing

Standard penetration testing (SPT) carried out in accordance with BS EN ISO 22476-3:2005.

Continuous dynamic probe testing conducted using a super heavy DPSH-B (As defined by BS EN ISO 22476-2:2005) probing geometry. The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

Perth penetrometer tests carried out in accordance with Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes; no equivalent European or British Standard having been published to date.

Undrained shear strength determinations made in-situ using a Geonor hand shear vane or a hand penetrometer.

Testing to determine the in-situ California Bearing Ratio (CBR) of soils conducted at shallow depths using a hand-held Transport Research Laboratory (TRL) cone penetrometer.

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Glebe House, Upper West Lane, North Lancing, West Sussex

Job Number: P16687

Start Date: 27/06/2024

End Date: 27/06/2024

Borehole Number: **WS01** Sheet 1 of 2

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Concrete.
							0.25	
							0.35	MADE GROUND: Brown gravelly silty sand. Gravel is subangular to subrounded fine to coarse flint, sandstone, charcoal-like material, brick and rare chalk.
	D	0.80						MADE GROUND: Dark brown slightly gravelly silty clay. Gravel is subangular to subrounded fine to coarse flint with rare brick, sandstone, charcoal-like material and chalk.
	V	1.00		60				
	D	1.20					1.10	Stiff brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. (Head)
	H	1.30		75				
	H	1.60		75			1.50	Stiff light brown gravelly silty CLAY. Gravel is subangular to subrounded fine to medium chalk with occasional bands of fine to coarse flint. (Head)
	D	1.70						
	V	2.00		110				
	H	2.20		140				
	D	2.30						
	H	2.50		140				
	H	2.75		125				
	D	2.90						
	D	3.20						
	H	3.40		140				
	D	3.80						with occasional slightly sandy bands below 3.70m depth.
	D	4.30						
	H	4.50		75			4.50	Stiff brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint and occasional chalk. (Head)
	D	4.70						
	H	4.80		90				
							5.00	

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 5.75m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Glebe House, Upper West Lane, North Lancing, West Sussex

Job Number: P16687

Start Date: 27/06/2024

End Date: 27/06/2024

Borehole Number: **WS01**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
	H	5.20		190				Very stiff brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint and occasional chalk. (Head)
	D	5.30					5.40	Medium dense orange brown very clayey fine to medium SAND. (Head)
	D	5.80					6.00	End of borehole at 6.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 5.75m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Glebe House, Upper West Lane, North Lancing, West Sussex

Job Number: P16687

Start Date: 27/06/2024

End Date: 27/06/2024

Borehole Number: **WS02**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
							0.00	Topsoil.
							0.15	MADE GROUND: Dark brown gravelly silty clay. Gravel is subangular to subrounded fine to coarse flint, chalk, brick, sandstone and charcoal-like material.
	D	0.40						
							0.70	Stiff brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. (Head)
	H	0.80		125				
	D	0.90						
	H	1.20		150				
	D	1.40						
	H	1.50		>250				becoming very stiff below 1.50m depth.
	D	1.90						
	H	1.90		>250			1.95	Very stiff light brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse chalk and flint. (Head)
	V	2.00		>130				
	D	2.20						
	D	2.70						becoming very gravelly below 2.70m depth. with frequent bands of flint gravel below 2.90m depth. poor recovery of soil sample between 3.00m and 4.00m below ground level.
	D	3.40						
	D	3.80					3.75	Very stiff brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. (Head)
								becoming slightly gravelly below 4.00m depth.
	D	4.20						
	H	4.30		165				
	D	4.60						
	H	4.60		165				
							4.95	

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 5.50m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Glebe House, Upper West Lane, North Lancing, West Sussex

Job Number: P16687

Start Date: 27/06/2024

End Date: 27/06/2024

Borehole Number: **WS02**

Standpipe	Samples and In Situ Testing: Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe 0 5 10 15 20 25 30	Legend	Depth	Stratum Description
	D	5.20						Stiff to very stiff orange brown and brown sandy CLAY with bands of very clayey fine to medium SAND. (Head)
	D	5.90					6.00	End of borehole at 6.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole collapsed to 5.50m depth on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: GRD

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Glebe House, Upper West Lane, North Lancing, West Sussex

Job Number: P16687

Start Date: 27/06/2024

End Date: 27/06/2024

Trial Pit Number: **TP01**

Sample/ Test Type	Samples and In Situ Testing: Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
					0.00	Concrete.
					0.25	
D	0.40					MADE GROUND: Dark brown grey gravelly silty clay. Gravel is angular to subrounded fine to coarse flint, brick, chalk, concrete, ironstone and charcoal-like material. With occasional cobbles.
					0.60	
D	0.70					MADE GROUND: Dark brown slightly gravelly silty clay. Gravel is angular to subangular fine to coarse flint with rare brick and sandstone.
P	0.75	1.05	9			
					1.00	
P	1.05	1.35	18			End of trial pit at 1.00m
P	1.35	1.65	46			

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: Trial pit dug to 0.60m and extended to 1.00m with hand augering techniques.

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: GRD

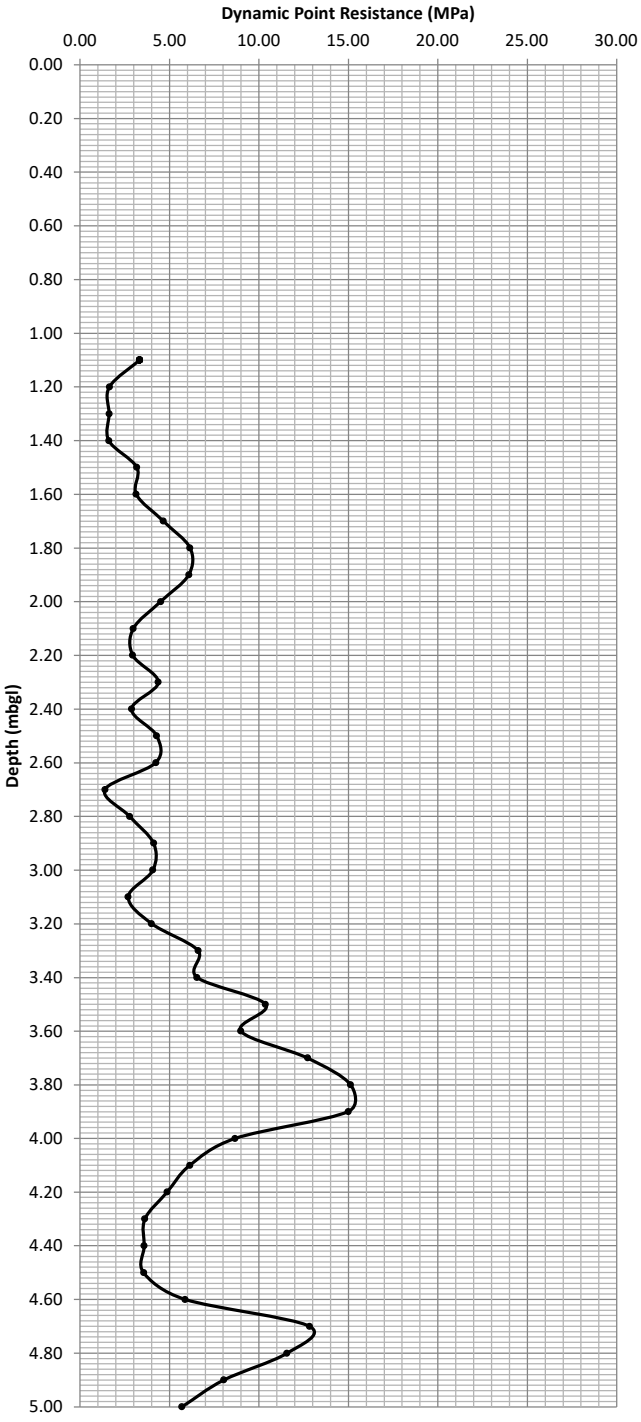
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Glebe House, Upper West Lane, North Lancing, West Sussex **Report Ref.** P16687

Test Location Reference	WS01

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
0.50				
0.60				
0.70				
0.80				
0.90				
1.00				
1.10	2	0.05	3.89	3.33
1.20	1	0.10	1.94	1.64
1.30	1	0.10	1.94	1.63
1.40	1	0.10	1.94	1.61
1.50	2	0.05	3.89	3.18
1.60	2	0.05	3.89	3.14
1.70	3	0.03	5.83	4.66
1.80	4	0.03	7.77	6.15
1.90	4	0.03	7.77	6.08
2.00	3	0.03	5.83	4.51
2.10	2	0.05	3.89	2.98
2.20	2	0.05	3.89	2.94
2.30	3	0.03	5.83	4.37
2.40	2	0.05	3.89	2.88
2.50	3	0.03	5.83	4.28
2.60	3	0.03	5.83	4.24
2.70	1	0.10	1.94	1.40
2.80	2	0.05	3.89	2.77
2.90	3	0.03	5.83	4.11
3.00	3	0.03	5.83	4.08
3.10	2	0.05	3.89	2.69
3.20	3	0.03	5.83	4.00
3.30	5	0.02	9.72	6.60
3.40	5	0.02	9.72	6.54
3.50	8	0.01	15.55	10.37
3.60	7	0.01	13.60	8.99
3.70	10	0.01	19.44	12.72
3.80	12	0.01	23.32	15.13
3.90	12	0.01	23.32	15.00
4.00	7	0.01	13.60	8.67
4.10	5	0.02	9.72	6.14
4.20	4	0.03	7.77	4.87
4.30	3	0.03	5.83	3.62
4.40	3	0.03	5.83	3.59
4.50	3	0.03	5.83	3.56
4.60	5	0.02	9.72	5.88
4.70	11	0.01	21.38	12.83
4.80	10	0.01	19.44	11.57
4.90	7	0.01	13.60	8.03
5.00	5	0.02	9.72	5.69



Notes:

Hammer Mass	63.5	kg
Fall Height	0.76	m
Cone Area	0.0019	m^2
E_{theor}	473	J
Energy Ratio	0.78	
Anvil Mass	1	kg
Rod Mass	8.79	kg/m

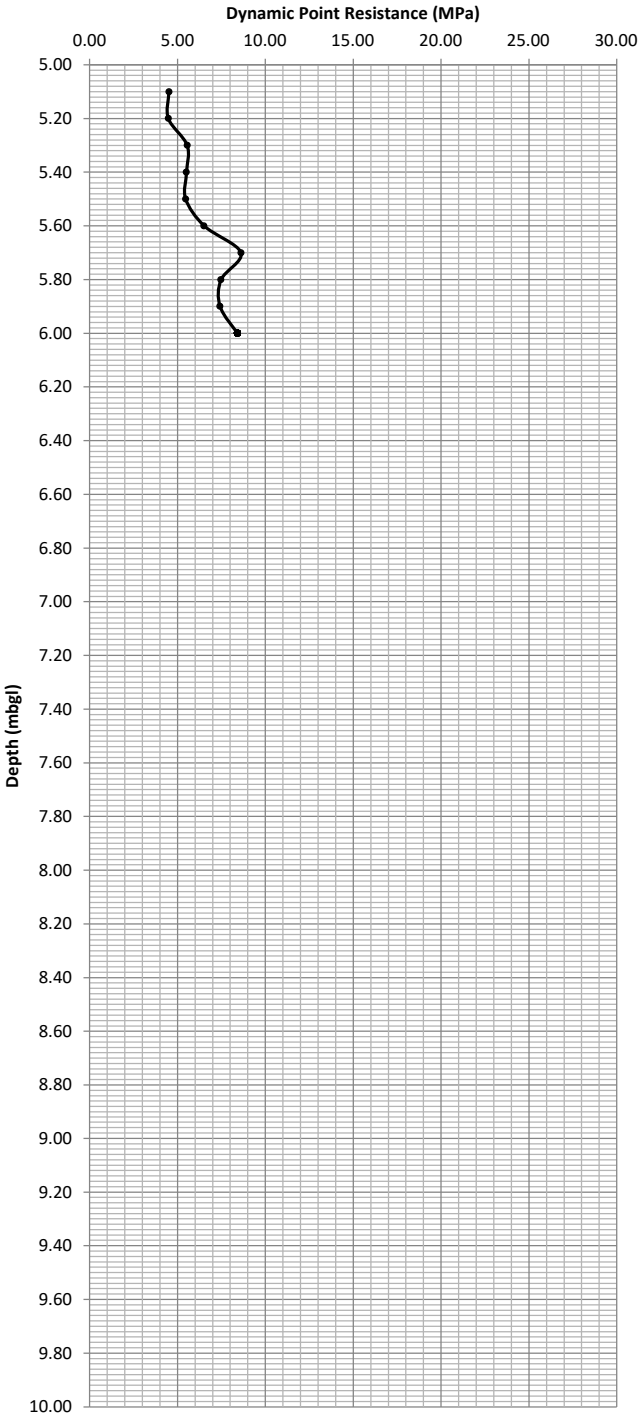
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Glebe House, Upper West Lane, North Lancing, West Sussex **Report Ref.** P16687

Test Location Reference	WS01

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	4	0.03	7.77	4.52
5.20	4	0.03	7.77	4.48
5.30	5	0.02	9.72	5.56
5.40	5	0.02	9.72	5.51
5.50	5	0.02	9.72	5.47
5.60	6	0.02	11.66	6.51
5.70	8	0.01	15.55	8.62
5.80	7	0.01	13.60	7.48
5.90	7	0.01	13.60	7.43
6.00	8	0.01	15.55	8.42
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
7.60				
7.70				
7.80				
7.90				
8.00				
8.10				
8.20				
8.30				
8.40				
8.50				
8.60				
8.70				
8.80				
8.90				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
9.60				
9.70				
9.80				
9.90				
10.00				



Notes:

Hammer Mass	63.5	kg
Fall Height	0.76	m
Cone Area	0.0019	m^2
E_{theor}	473	J
Energy Ratio	0.78	
Anvil Mass	1	kg
Rod Mass	8.79	kg/m

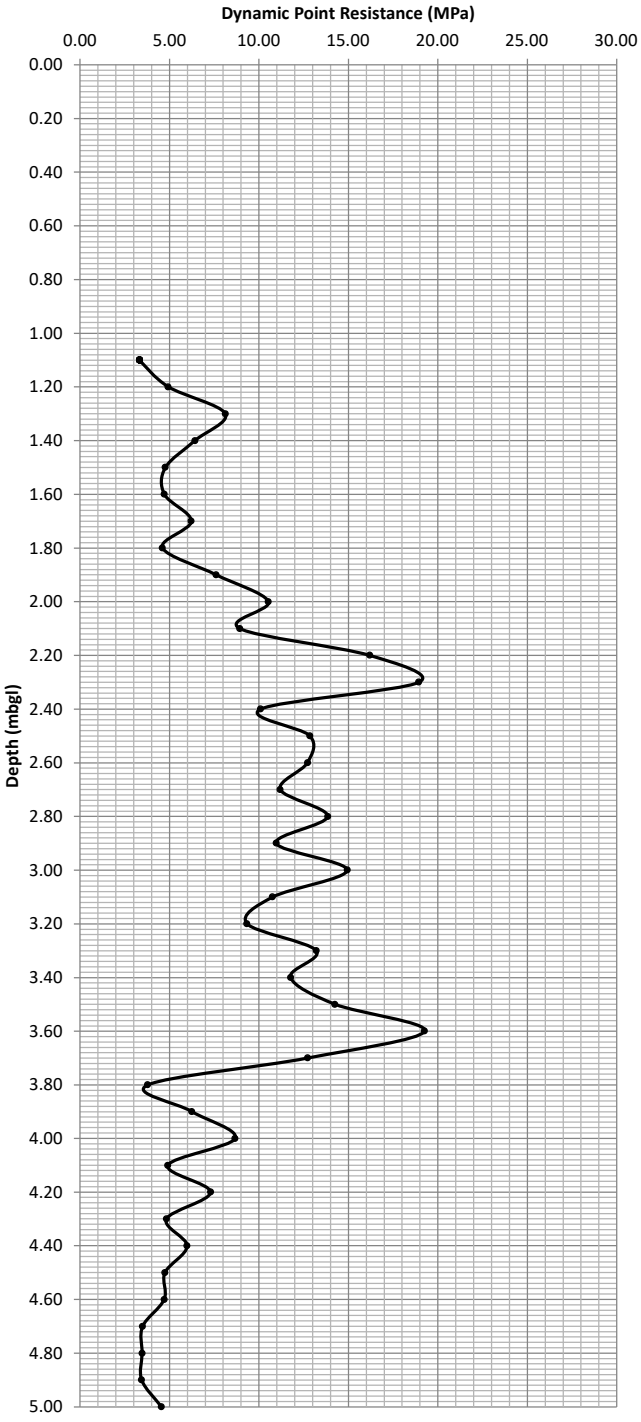
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Glebe House, Upper West Lane, North Lancing, West Sussex **Report Ref.** P16687

Test Location Reference	WS02

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40				
0.50				
0.60				
0.70				
0.80				
0.90				
1.00				
1.10	2	0.05	3.89	3.33
1.20	3	0.03	5.83	4.93
1.30	5	0.02	9.72	8.13
1.40	4	0.03	7.77	6.43
1.50	3	0.03	5.83	4.77
1.60	3	0.03	5.83	4.71
1.70	4	0.03	7.77	6.21
1.80	3	0.03	5.83	4.61
1.90	5	0.02	9.72	7.60
2.00	7	0.01	13.60	10.53
2.10	6	0.02	11.66	8.93
2.20	11	0.01	21.38	16.19
2.30	13	0.01	25.27	18.94
2.40	7	0.01	13.60	10.09
2.50	9	0.01	17.49	12.85
2.60	9	0.01	17.49	12.72
2.70	8	0.01	15.55	11.19
2.80	10	0.01	19.44	13.85
2.90	8	0.01	15.55	10.97
3.00	11	0.01	21.38	14.94
3.10	8	0.01	15.55	10.76
3.20	7	0.01	13.60	9.33
3.30	10	0.01	19.44	13.20
3.40	9	0.01	17.49	11.77
3.50	11	0.01	21.38	14.25
3.60	15	0.01	29.15	19.26
3.70	10	0.01	19.44	12.72
3.80	3	0.03	5.83	3.78
3.90	5	0.02	9.72	6.25
4.00	7	0.01	13.60	8.67
4.10	4	0.03	7.77	4.91
4.20	6	0.02	11.66	7.30
4.30	4	0.03	7.77	4.83
4.40	5	0.02	9.72	5.98
4.50	4	0.03	7.77	4.75
4.60	4	0.03	7.77	4.71
4.70	3	0.03	5.83	3.50
4.80	3	0.03	5.83	3.47
4.90	3	0.03	5.83	3.44
5.00	4	0.03	7.77	4.55



Notes:

Hammer Mass	63.5	kg
Fall Height	0.76	m
Cone Area	0.0019	m^2
E_{theor}	473	J
Energy Ratio	0.78	
Anvil Mass	1	kg
Rod Mass	8.79	kg/m

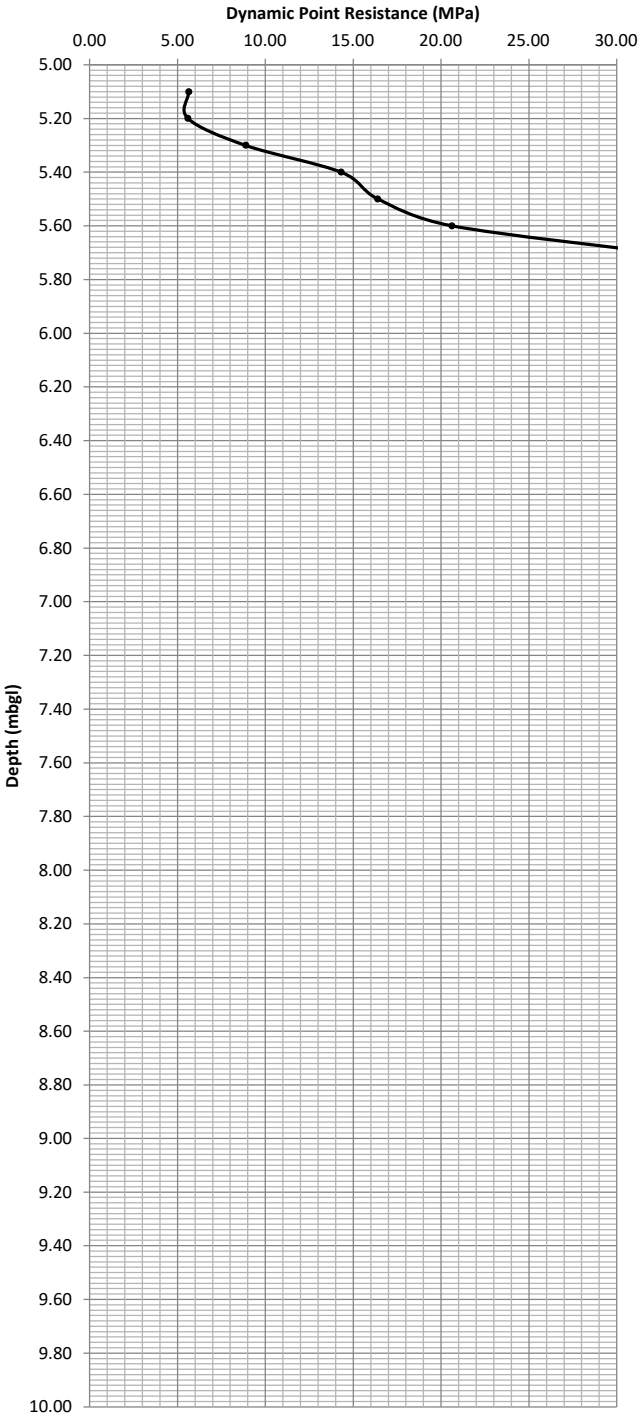
ASHDOWN SITE INVESTIGATION LTD

Dynamic Probe Record

SITE Glebe House, Upper West Lane, North Lancing, West Sussex **Report Ref.** P16687

Test Location Reference	WS02

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	5	0.02	9.72	5.65
5.20	5	0.02	9.72	5.60
5.30	8	0.01	15.55	8.89
5.40	13	0.01	25.27	14.33
5.50	15	0.01	29.15	16.41
5.60	19	0.01	36.93	20.62
5.70	30	0.00	58.31	32.32
5.80				
5.90				
6.00				
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
7.30				
7.40				
7.50				
7.60				
7.70				
7.80				
7.90				
8.00				
8.10				
8.20				
8.30				
8.40				
8.50				
8.60				
8.70				
8.80				
8.90				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
9.60				
9.70				
9.80				
9.90				
10.00				



Notes:
No further progress below 5.70m - hammer bouncing.

Hammer Mass	63.5	kg
Fall Height	0.76	m
Cone Area	0.0019	m^2
E_{theor}	473	J
Energy Ratio	0.78	
Anvil Mass	1	kg
Rod Mass	8.79	kg/m

APPENDIX C

Geotechnical Laboratory Test Results

ASHDOWN SITE INVESTIGATION LIMITED

Soil Classification Summary

Site Name:	Glebe House, Upper West Lane, North Lancing, West Sussex	Job No:	P16687

BH/TP No.	Depth (m)	Nat. Moist. Cont. (w %)	Equiv. Moist. Cont. (w_a %)	Atterberg Limits			Class'n	Cons. Index (I_c)	% passing 425 µm sieve	Visual Description of Sample
				W_l %	W_p %	I_p %				
WS01	1.70	21		31	18	13	CIL	0.77*	58	Stiff light brown gravelly silty CLAY. Gravel is fine to medium flint and chalk.
WS01	4.70	16		35	17	18	CIL/CIM	1.06*	50	Very stiff brown gravelly silty CLAY. Gravel is fine to coarse flint.
WS02	0.90	19		31	18	13	CIL	0.92*	90	Stiff brown slightly gravelly silty CLAY. Gravel is fine to coarse flint.
WS02	2.20	13		26	16	10	CIL	1.30*	65	Very stiff light brow gravelly silty CLAY. Gravel is fine to medium flint and chalk.
WS02	4.20	20		62	24	38	CIH	1.11*	76	Very stiff brown slightly gravelly CLAY. Gravel is fine to coarse flint.

Test Method: Classification Tests BS1377: Part 2: 1990: Method 4.4, 5.3 and 5.4

* Consistency index based on natural moisture content and not the equivalent moisture content.

Alex Bewick
Ashdown Site Investigations Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-07441

Site Reference:	Glebe House, Upper West Lane, North Lancing, West Sussex
Project / Job Ref:	P16687 2293
Order No:	11724
Sample Receipt Date:	02/07/2024
Sample Scheduled Date:	02/07/2024
Report Issue Number:	1
Reporting Date:	08/07/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 24-07441	**~Date Sampled**	27/06/24	27/06/24	27/06/24		
Ashdown Site Investigations Ltd	**~Time Sampled**	None Supplied	None Supplied	None Supplied		
~Site Reference: Glebe House, Upper West Lane, North Lancing, West Sussex	**~TP / BH No**	WS01	WS01	WS02		
~Project / Job Ref: P16687_2293	**~Additional Refs**	None Supplied	None Supplied	None Supplied		
~Order No: 11724	**~Depth (m)**	1.20	2.30	3.80		
Reporting Date: 08/07/2024	**DETS Sample No**	724332	724333	724334		

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.0	8.5	8.3		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	< 10	< 10	12		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	< 0.01	< 0.01	0.01		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)
~Sample details provided by customer and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Sample Descriptions
DETS Report No: 24-07441
Ashdown Site Investigations Ltd
~Site Reference: Glebe House, Upper West Lane, North Lancing, West Sussex
~Project / Job Ref: P16687_2293
~Order No: 11724
Reporting Date: 08/07/2024

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
724332	WS01	None Supplied	1.20	17.1	Light brown sandy clay
724333	WS01	None Supplied	2.30	13.5	Light brown sandy clay with chalk
724334	WS02	None Supplied	3.80	11.4	Light brown sandy clay with stones and chalk

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
~Sample details provided by customer and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-07441

Ashdown Site Investigations Ltd

~Site Reference: Glebe House, Upper West Lane, North Lancing, West Sussex

~Project / Job Ref: P16687_2293

~Order No: 11724

Reporting Date: 08/07/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

~Sample details provided by customer and can affect the validity of results

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

List of HWOL Acronyms and Operators
DETS Report No: 24-07441
Ashdown Site Investigations Ltd
~Site Reference: Glebe House, Upper West Lane, North Lancing, West Sussex
~Project / Job Ref: P16687_2293
~Order No: 11724
Reporting Date: 08/07/2024

Acronym	**Description**
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by customer and can affect the validity of results

Det - Acronym