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**HILL FARM**

**DUNS TEW**

**AGRICULTURAL LAND CLASSIFICATION**

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Prepared on behalf of:

**Greenheath NRG Limited**

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# 1 Introduction

## 1.1 Background to the Report

This report has been prepared by Tim O'Hare Associates LLP for Greenheath NRG Limited to determine the quality of agricultural land at an approximately 14-hectare (ha) site at Hill Farm, OX25 6JJ ('the Site').

The Site is located to the north of Duns Tew at British National Grid (BNG) reference SP 45845 30029. The boundary of the land required for the proposed development is shown on *Figure 1*.

## 1.2 Methodology

The work has been carried out by a Chartered Scientist, who is a Member of the Institute of Professional Soil Scientists (IPSS). The IPSS is the chartered and professional body of the British Society of Soil Science (BSSS). In addition, this ALC survey has been carried out by a soil scientist who meets the requirements of the IPSS Professional Competency Scheme for ALC (see IPSS PCSS Document 2 'Agricultural Land Classification of England and Wales', given as **Appendix 1**). The IPSS Professional Competency Scheme is endorsed, amongst others, by the Department for Environment, Food and Rural Affairs (Defra), Natural England, the Science Council, and the Institute of Environmental Assessment and Management (IEMA) (see **Appendix 1** also).

This assessment of agricultural land quality has followed the approach of the Ministry of Agriculture, Fisheries and Food (MAFF)<sup>1</sup> 'Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land', October, 1988 (henceforth referred to as the 'the ALC Guidelines').

The ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The ALC system divides agricultural land into five grades (Grade 1 'Excellent' to Grade 5 'Very Poor'), with Grade 3 subdivided into Subgrade 3a 'Good' and Subgrade 3b 'Moderate'. Agricultural land classified as Grade 1, 2 and Subgrade 3a falls in the 'best and most versatile' category, as set out in the National Planning Policy Framework (see Section 2.0 for further details on the relevant planning policy framework). Further details of the ALC system and national planning policy implications are set out by Natural England in its Technical Information Note 049, given as **Appendix 2**.

A detailed ALC survey of approximately 14 ha of agricultural land was completed on the 22<sup>nd</sup> of August 2019. The ALC survey involved examination of the soil's physical properties at 15 locations. One soil pit was hand-dug with a spade in order to examine soil physical properties, such as horizon development (soil layers), stone content and soil structure in detail. The location of the auger bores and the soil pit is shown on *Figure 1*. The sample locations were located using a hand-held Garmin E-Trec Geographic Information System (GIS) to enable the sample locations to be relocated for verification, if necessary.

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<sup>1</sup> The Ministry of Agriculture, Fisheries and Food (MAFF) was incorporated within the Department for Environment, Food and Rural Affairs (Defra) in June 2001

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The soil profile was examined at each sample location at the Site to a maximum depth of approximately 1.2 m by hand with the use of a 5 cm diameter Dutch (Edleman) soil auger. The soil profile at each sample location was described using the 'Soil Survey Field Handbook: Describing and Sampling Soil Profiles' (Ed. J.M. Hodgson, Cranfield University, 1997). Each soil profile was ascribed an Agricultural Land Classification (ALC) grade following the MAFF ALC Guidelines. A log of the soil profiles recorded on Site is given as **Appendix 3**.

A sample of topsoil was collected at three sample locations, locations 2, 8 and 15, as shown on *Figure 1*. The samples were sent to an accredited laboratory for determination of soil particle size distribution (PSD), i.e. soil texture – the proportion of sand, silt and clay particles. The findings of the laboratory PSD analysis are given in *Table 2*, Section 3.4.

### 1.3 Structure of the Report

The remainder of this report is structured as follows:

- Section 2 – National Planning Policy Framework;
- Section 3 – Agricultural Land Classification;
  - General
  - Climate;
  - The Site (Gradient, Micro-relief, Risk of Flooding);
  - Geology and Soil;
  - Interactive Limitations (Soil Droughtiness and / or Soil Wetness);
  - Most Limiting Factor
- Section 4 – Summary and Conclusion.

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## 2 National Planning Policy Framework

### 2.1 Background

This section of the report sets out the national planning framework in which to assess the opportunities and constraints to development at the Site in agricultural land quality terms.

### 2.2 National Planning Policy

National planning policy guidance on development involving agricultural land is set out in National Planning Policy Framework (NPPF), which was revised on the 19<sup>th</sup> February 2019. The NPPF aims to provide a simplified planning framework which sets out the Government's economic, environmental and social planning policies for England. The NPPF includes policy guidance on 'Conserving and Enhancing the Natural Environment' (Section 15). Paragraph 170 (a and b) (page 49) are of relevance to this assessment of agricultural land quality and soil and state that:

*'170...Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*

*b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;...'*

### 2.3 Environment White Paper

The NPPF was preceded and informed by the first White Paper on the Environment in twenty years. Entitled 'The Natural Choice: Securing the Value of Nature' (June 2011), the White Paper sets out, in part, the importance that the Coalition Government places on the soil's ability to support vital ecosystem services such as flood mitigation, carbon storage and nutrient cycling.

### 2.4 Best Practice Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published 'Safeguarding our Soils – A Strategy for England' (24th September 2009). The Soil Strategy was published in tandem with a 'Code of Practice for the Sustainable Use of Soils on Construction Sites'.

The Soil Strategy for England, which builds on Defra's 'Soil Action Plan for England (2004-2006)', sets out an ambitious vision to protect and improve soil to meet an increased global demand for food and to help combat the adverse effects of climate change.

## 3 Agricultural Land Quality at the Site

### 3.1 General

This section of the report sets out the findings of the desktop study and the ALC survey carried out by a Chartered Scientist on 22<sup>nd</sup> August 2019 (see 'Methodology' at Section 1.2 earlier).

The desktop study is based upon the findings of a study of published information on topography, geology, climate and soil and MAFF ALC information, as follows:

- (i) topography (re Ordnance Survey contour information);
- (ii) geology (re British Geological Survey information);
- (iii) climate and soil (re Soil Survey of England and Wales (SSEW) provisional soil information given in '*Soils and their use in South East England*' (SSEW Bulletin No.15, 1984) and accompanying soil map at a scale of 1:250,000; and
- (iv) ALC information produced by MAFF and ALC maps provided Natural England, where available.

As described in the ALC Guidelines, the main physical factors influencing agricultural land quality are:

- climate;
- site;
- soil; and
- interactive limitations.

These factors are considered in turn below.

### 3.2 Climate

Climate data relevant to the determination of the ALC grade of land at the Site is given in *Table 3.1* below.

<b>Climate Parameter</b>	<b>Data</b>
Average Altitude (mAOD)	87
Average Annual Rainfall (mm)	685
Median Accumulated Temperature above 0°C (January – June)	1405
Moisture Deficit for Wheat (mm)	103
Moisture Deficit for Potatoes (mm)	94
Mean Field Capacity Days (FCD)	152
Best Grade According to Climate	1

With reference to Figure 1 'Grade according to climate' on page 6 of the ALC Guidelines, agricultural land at this Site cannot be graded higher than Grade 2, due to an overall climate limitation.

Climate interacts with soil to cause certain 'interactive limitations', namely soil wetness, i.e. where the soil moisture regime adversely affects plant growth/seed germination, and/or imposes restrictions to cultivations or grazing by livestock, and soil droughtiness, i.e. a shortage of water stored in the soil that is available for plant uptake during the growing season. Interactive limitations to agricultural land quality at the Site are considered further in Section 3.5.

### 3.3 The Site

As shown on *Figure 1*, the planning application (red line) boundary measures approximately 14 ha. The Site is located north of Hill Farm, Duns Tew, Cherwell, Oxfordshire. The west of the Site is bordered by a solar farm, with the north of the Site boarded by a spring. The Site is mainly surrounded by agricultural land, with the urban land at Duns Tew to the south of the Site.

With regard to the ALC Guidelines, agricultural land quality can be limited by one or more of three main site factors as follows:

- gradient;
- micro-relief (i.e. complex change in slope angle over short distances); and
- risk of flooding.

#### Gradient and Micro-Relief

The elevation of the Site is relatively level, ranging from approximately 87m Above Ordnance Datum (AOD) at the lowest point in the north and south, to approximately 90 mAOD in the west. Agricultural land at the Site is not limited by gradient, i.e. the angle of slope is less than 7°.

The quality of agricultural land at the Site is not limited by micro-relief, i.e. where there are complex changes in slope angle over short distances.

#### Risk of Flooding

From a Government Flood Map for Planning<sup>2</sup>, land at the Site is located in Flood Zone 1, with a low probability of flooding, with a small region of Flood Zone 3 bordering the north of the Site by the Spring. From the flood risk information, coupled with the Site survey, it has been determined that the risk of flooding is not detrimental to agricultural land quality at the Site (re Table 2 and Table 3 of the ALC Guidelines).

### 3.4 Geology and Soil

#### Geology/Soil Parent Material

British Geological Survey (BGS) information available online has been utilised to show the Superficial Deposits (Drift) and Bedrock underlying the Site.<sup>3</sup> This provides information on the geological materials in which the soil has formed.

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<sup>2</sup> Government Flood Risk Map for Planning. Available online @ <https://flood-map-for-planning.service.gov.uk/confirm-location?easting=496528&northing=237383&placeOrPostcode=MK43%200XP> Last viewed 6<sup>th</sup> September 2019

<sup>3</sup> British Geological Survey 'Geology of Britain Viewer'. Available online @ <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer>. Last viewed 6<sup>th</sup> September 2019



The whole Site is underlain by the Charmouth Mudstone Formation (mudstone). The bedrock is not covered by Superficial Deposits, except for some Alluvium (clay, silt, sand and gravel) in the far north.

#### Published Soil Information

The Soil Survey of England and Wales (SSEW) soil map of South East England (Sheet 6) at a scale of 1:250,000 and accompanying Bulletin No. 15 '*Soils and their Use in South East England*' (M.G. Jarvis *et al*, Harpenden, 1984) reports that agricultural land at the Site is entirely covered by soils grouped in the *Wickham 2* association.

The *Wickham 2* association consist of soils that are fine silty or fine loamy over clayey typical stagnogleys. These soils have slowly permeable subsoils and are waterlogged for long periods in winter (Wetness Class IV) when undrained. This association is the most extensive in the Low Weald where intermittent thin drift rests on Atherfield and Weald Clays.

#### Soil Survey

A detailed soil survey was carried out at the Site on the 22<sup>nd</sup> August 2019. The soil survey confirms the presence of slightly to moderately flinty, heavy silty clay loam and silty clay topsoil over slowly permeable and seasonally waterlogged clay subsoil (Wetness Classes III and IV). These soils are consistent with those described by the SSEW in the *Wickham 2* Association (see above).

A log of the soil profiles recorded on Site is given as **Appendix 3**. A description of the soil profile recorded at Soil Pit 1 is given as **Appendix 4**.

#### Laboratory Analysis of Topsoil Particle Size Distribution (PSD)

In order to substantiate topsoil texture determined hand-texturing during the soil survey, three samples of topsoil were collected from Sample Locations 2, 8 and 15 (see *Figure 1*). The topsoil sample was sent to an accredited laboratory for analysis of particle size distribution (PSD), based on the British Standard Institution particle size grades. The findings of the PSD analysis are given in Table 3.2. A laboratory Certificate of Analysis is given as **Appendix 5**.

<b>Topsoil Sample Location (See <i>Figure 1</i>)</b>	<b>% Sand 0.063-2.0 mm</b>	<b>% Silt 0.002- 0.063 mm</b>	<b>% Clay &lt;0.002 mm</b>	<b>Soil Texture Class</b>
2	12	51	37	Silty Clay
8	11	53	36	Silty Clay
15	13	54	33	Heavy Silty Clay Loam

### 3.5 Interactive Limitations

From the published information above and the results of the Site visit, it has been determined that the quality of agricultural land at the Site is limited by a soil wetness, as described below.

#### Soil Wetness

From the ALC Guidelines, a soil wetness limitation exists where 'the soil water regime adversely affects plant growth or imposes restrictions on cultivations or grazing by livestock'.

The ALC grade according to soil wetness at the Site is given in Table 3.3 below (based on Table 6 'Grade According to Soil Wetness – Mineral Soils' in the ALC Guidelines):

<b>Table 3.3: ALC Grade According to Soil Wetness</b>		
<b>Wetness Class</b>	<b>Texture of the Top 25 cm</b>	<b>151-175 Field Capacity Days</b>
III	Sandy Silt Loam/Sandy Loam	2
	Medium Silty Clay Loam/Medium Clay Loam*	3a
	Heavy Silty Clay Loam/Heavy Clay Loam**	3b
	Silty Clay/Clay	3b
IV	Sandy Silt Loam/Sandy Loam	3a
	Medium Silty Clay Loam/Medium Clay Loam*	3b
	Heavy Silty Clay Loam/Heavy Clay Loam**	3b
	Silty Clay/Clay	3b
Key * <27% clay; and ** >27% clay Brackets denotes grade for naturally calcareous soils (more than 1% CaCO <sub>3</sub> ) with between 18% and 50% clay content.		

All of the topsoils are non-calcareous. Therefore, soil profiles at the Site, in a climate area with 152 field capacity days (FCD), which are slightly seasonally waterlogged (Wetness Class III) or seasonally waterlogged (Wetness Class IV) are limited by soil wetness to Subgrade 3b where the topsoil is heavy silty clay loam or silty clay.

### 3.6 Most Limiting Factor

This ALC assessment has determined that soil wetness is the most limiting factor(s) to agricultural land quality at the Site.

The area and proportion of agricultural land in each ALC grade has been measured from an ALC map given as *Figure 2*. The findings are reported in Table 3.5 below.

<b>ALC Grade</b>	<b>Total (Ha)</b>	<b>Total (% of Site)</b>
Grade 1 (Excellent)	0	0
Grade 2 (Very Good)	0	0
Subgrade 3a (Good)	0	0
<i>Best and Most Versatile (BMV), i.e. ALC Grade 1, 2 and Subgrade 3a</i>	0	0
Subgrade 3b (Moderate)	14.0	100
Grade 4 (Poor)	0	0
Grade 5 (Very Poor)	0	0
Non-agricultural	0	0
<b>Total</b>	<b>14.0</b>	<b>100</b>

## 4 Summary and Conclusion

This report has been prepared by Tim O'Hare Associates LLP for Greenheath NRG Limited, to determine the quality of agricultural land at an approximately 14 hectare (ha) site at Hill Farm, Duns Tew, Oxfordshire, OX25 6JJ ('the Site'). The Site is located to north of Duns Tew at British National Grid (BNG) reference SP45845 30029. The boundary of the land required for the proposed development is shown on *Figure 1*.

British Geological Survey (BGS) information available online has been used to the Bedrock and Superficial Deposits (Drift). This provides information on the geological materials in which the soil has formed. The whole Site is underlain by Charmouth Mudstone Formation (mudstone). The bedrock is not covered by a superficial deposit, except for some Alluvium (clay, silt, sand and gravel) in the far north.

The Soil Survey of England and Wales (SSEW) soil map of Wales (Sheet 2) at a scale of 1:250,000 and accompanying Bulletin No. 15 '*Soils and their Use in South East England*' (M.G.Jarvis *et al*, Harpenden, 1984) reports that agricultural land at the Site is entirely covered by soils grouped in the *Wickham 2* Association.

A detailed soil survey was carried out at the Site on the 22<sup>nd</sup> August 2019. The soil survey confirms the presence of heavy silty clay loam and silty clay topsoil over slowly permeable and seasonally waterlogged clay subsoil (Wetness Classes III and IV). These soils are consistent with those described by the SSEW in the *Wickham 2* Association.

This ALC assessment has determined soil wetness is the most limiting factor to agricultural land quality at the Site. Approximately 14 ha (100%) of the Site is limited to Subgrade 3b.

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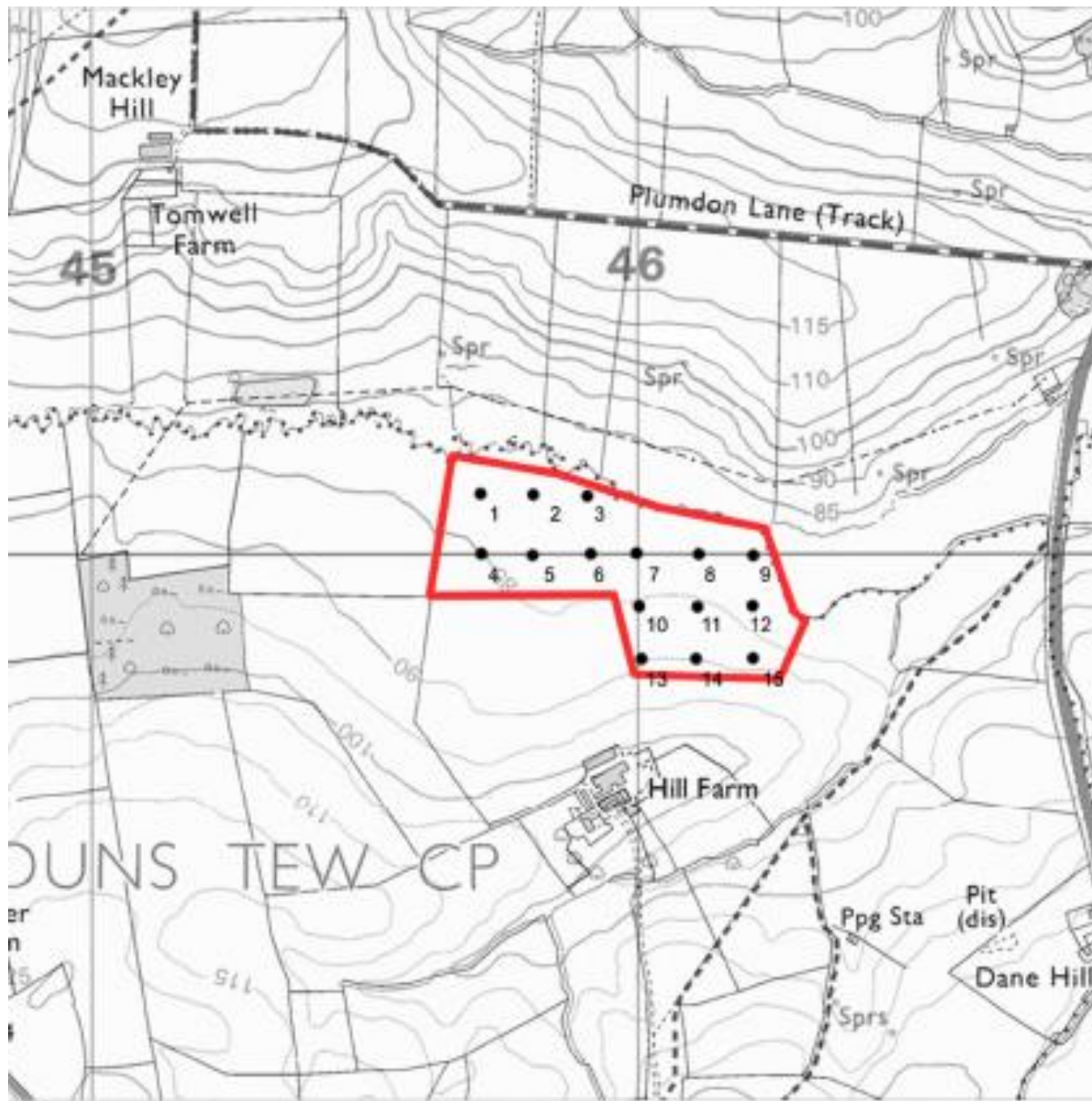
Report Qualifications

TOHA's interpretation of the site characteristics is based on available data from the desktop study and observations made during the site investigation and the results of laboratory tests. This report has evaluated the characteristics of the site in relation to the assessment of its Agricultural Land Classification.

It should not therefore be relied on for alternative end-uses or for other schemes. This report has been prepared solely for the benefit of Greenheath NRG Limited. No warranty is provided to any third party and no responsibility or liability will be accepted for any loss or damage in the event that this report is relied upon by a third party or is used in circumstances for which it was not originally intended.

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## Figures



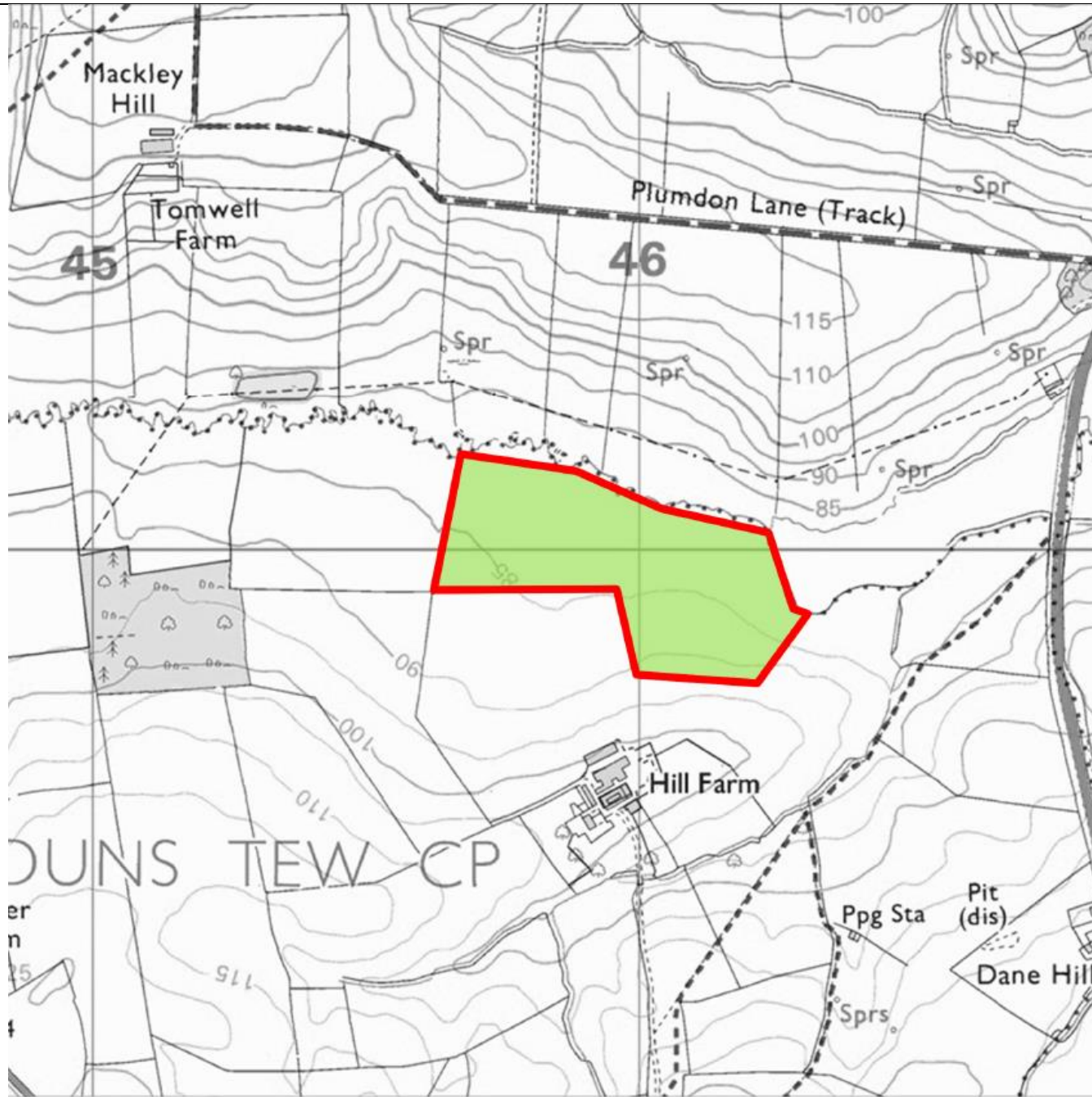
- Site boundary
- 1 • Auger location
- Topsoil Sample



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Client:	Greenheath NRG Limited		
Project:	Hills Farm, Duns Tew		
Job ref no.:	TOHA/19/5386/LHJ		
Drawing no.:	5386/1		
Drawing title:	Sample Locations		
Date:	Sept 19	Scale:	NTS
Drawn by:	ELA	Checked by:	LHJ

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- Site Boundary
- ALC Grade**
- Grade 1
- Grade 2
- Subgrade 3a
- Subgrade 3b
- Grade 4
- Grade 5
- Other/Non-Agric.



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Client:	Greenheath NRG Limited		
Project:	Hills Farm, Duns Tew		
Job ref no.:	TOHA/19/5386/LHJ		
Drawing no.:	5386/2		
Drawing title:	Agricultural Land Classification		
Date:	Sept 19	Scale:	NTS
Drawn by:	ELA	Checked by:	LHJ

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**Appendix 1:**  
**IPSS Professional Competency Scheme Document 2**  
**Agricultural Land Classification**

# Agricultural Land Classification (England and Wales)

## Background

The evaluation of land for its agricultural potential in England and Wales<sup>1</sup> is accomplished by application of the Agricultural Land Classification<sup>2</sup> (ALC). Professional competence in Agricultural Land Classification builds upon foundation skills in field soil investigation, description and interpretation (IPSS PCSS Document 1). This system of professional competence is based upon a detailed written procedures document developed by the Farming and Rural Conservation Agency<sup>3</sup>.

## Qualifications

Professional soil scientists with competence in Agricultural Land Classification will have graduated in a relevant science subject. They will also have a number of years of relevant field experience and will have, or be adequately qualified for, membership of a relevant professional body such as the Institute of Professional Soil Scientists.

## Minimum competencies

### Skills and Knowledge:

These are described under a number of subheadings that relate to different tasks. A professionally competent contractor should have the skills and knowledge identified under the **General heading** and **all other headings that are relevant** to the tasks required.

#### General

- 1 A general knowledge and understanding of natural soil development and of world, European and national soil taxonomy
- 2 A detailed knowledge and understanding of the Agricultural Land Classification system relevant to the site and of the classification of land according to the current published Guidelines and other documents<sup>1,2</sup> and the ability to apply it accurately and consistently in the classification of an area of land

<sup>1</sup> Similar systems are employed in Scotland and Northern Ireland

<sup>2</sup> ALC Revised Guidelines and Criteria for the Grading the Quality of Agricultural Land (MAFF, 1988) and Climatological Datasets for ALC (Met. Office, 1989)

<sup>3</sup> A former Executive Agency of the Ministry of Agriculture, Fisheries and Food (now Defra)

# Agricultural Land classification (England and Wales)

- 3 An awareness and knowledge of existing published and unpublished, paper-based and digital ALC information and sources
- 4 A knowledge of paper and digital topographic, geology and soil maps, mineral assessment reports and memoirs and other technical sources of reference; and of their role in ALC work
- 5 An understanding of map scales and of the Ordnance Survey National Grid
- 6 The ability to investigate, sample, describe and interpret soils in the field in a consistent manner and to professional standards (IPSS PCSS Document 1)
- 7 Knowledge of relevant European and national regulations and policies including national and local land use planning policy and guidance, and soil protection policy
- 8 The ability to effectively communicate soil information in a simple and relevant form to developers, planners and other relevant professionals with clear statements as to the reliability and certainty of the results
- 9 The ability to write accurate, concise reports in clear English and in line with best practice examples of ALC survey that communicate the relevant information to all relevant communicants
- 10 An awareness of the importance of systems of quality assurance and control in all aspects of professional work

## Preparations prior to field survey

- 1 The ability to compile background site physical data (e.g. relief, geology, soils, climate, flood-risk, exposure and grade from published and unpublished sources) and understanding of the limitations of the data obtained
- 2 An understanding of scale and of how different survey sampling densities may impact on the certainty of results obtained. A knowledge of how to tailor survey density appropriately to the requirements of the client, and understanding of the limitations that might impose

- 3 The ability to compute gradients from map contours
- 4 A thorough knowledge of climatic data interpolation procedures (and any available associated bespoke computer software), and the ability to obtain representative site values
- 5 An understanding of soil maps, the concepts of soil associations and soil series and their limitations as a background to ALC grading
- 6 A knowledge of GPS and data logger technology and its uses and limitations for field survey work
- 7 A knowledge and understanding of relevant Health and Safety legislation requirements for work in the field
- 8 An understanding of basic biosecurity requirements and any animal or plant health restrictions which may be in force

## Field survey for Agricultural Land Classification

- 1 The ability to determine, lay out and work to a relevant sampling strategy
- 2 Competency in the Foundation Skills (field soil investigation, sampling, description and interpretation) as per IPSS PCSS Document 1
- 3 The ability to accurately and consistently apply the ALC system to soil and other data collected during the field survey

## Reporting

- 1 The knowledge and ability to compile an ALC map from background information and data collected during the field survey
- 2 The ability to write an ALC survey report according to an agreed format
- 3 Understanding of the principles of quality assurance and the ability to apply these as required by the client
- 4 The ability to convey the findings of the survey verbally such that they are understood by the client

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'Defra welcomes initiatives, such as the IPSS Working with Soils Competency Statements, that aim to improve the quality of professional soils advice'



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**Appendix 2:**  
**Natural England Technical Information Note 049 –**  
**Agricultural Land Classification**

# Agricultural Land Classification: protecting the best and most versatile agricultural land

**Most of our land area is in agricultural use. How this important natural resource is used is vital to sustainable development. This includes taking the right decisions about protecting it from inappropriate development.**

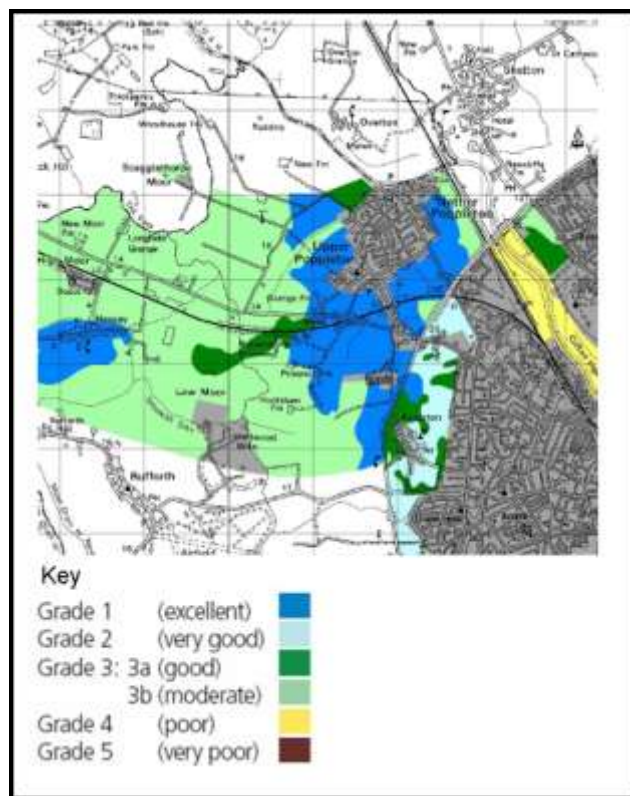
## Policy to protect agricultural land

Government policy for England is set out in the National Planning Policy Framework (NPPF) published in March 2012 (paragraph 112). Decisions rest with the relevant planning authorities who should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of higher quality. The Government has also re-affirmed the importance of protecting our soils and the services they provide in the Natural Environment White Paper *The Natural Choice: securing the value of nature* (June 2011), including the protection of best and most versatile agricultural land (paragraph 2.35).

## The ALC system: purpose & uses

Land quality varies from place to place. The Agricultural Land Classification (ALC) provides a method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. It helps

underpin the principles of sustainable development.



Agricultural Land Classification - map and key

## Agricultural Land Classification: protecting the best and most versatile agricultural land

The ALC system classifies land into five grades, with Grade 3 subdivided into Subgrades 3a and 3b. The best and most versatile land is defined as Grades 1, 2 and 3a by policy guidance (see Annex 2 of NPPF). This is the land which is most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non food uses such as biomass, fibres and pharmaceuticals. Current estimates are that Grades 1 and 2 together form about 21% of all farmland in England; Subgrade 3a also covers about 21%.

The ALC system is used by Natural England and others to give advice to planning authorities, developers and the public if development is proposed on agricultural land or other greenfield sites that could potentially grow crops. The Town and Country Planning (Development Management Procedure) (England) Order 2010 (as amended) refers to the best and most versatile land policy in requiring statutory consultations with Natural England. Natural England is also responsible for Minerals and Waste Consultations where reclamation to agriculture is proposed under Schedule 5 of the Town and Country Planning Act 1990 (as amended). The ALC grading system is also used by commercial consultants to advise clients on land uses and planning issues.

### Criteria and guidelines

The Classification is based on the long term physical limitations of land for agricultural use. Factors affecting the grade are climate, site and soil characteristics, and the important interactions between them. Detailed guidance for classifying land can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988):

- **Climate:** temperature and rainfall, aspect, exposure and frost risk.
- **Site:** gradient, micro-relief and flood risk.
- **Soil:** texture, structure, depth and stoniness, chemical properties which cannot be corrected.

The combination of climate and soil factors determines soil wetness and droughtiness.

Wetness and droughtiness influence the choice of crops grown and the level and consistency of yields, as well as use of land for grazing livestock. The Classification is concerned with the inherent potential of land under a range of farming systems. The current agricultural use, or intensity of use, does not affect the ALC grade.

### Versatility and yield

The physical limitations of land have four main effects on the way land is farmed. These are:

- the range of crops which can be grown;
- the level of yield;
- the consistency of yield; and
- the cost of obtaining the crop.

The ALC gives a high grading to land which allows more flexibility in the range of crops that can be grown (its 'versatility') and which requires lower inputs, but also takes into account ability to produce consistently high yields of a narrower range of crops.

### Availability of ALC information

After the introduction of the ALC system in 1966 the whole of England and Wales was mapped from reconnaissance field surveys, to provide general strategic guidance on land quality for planners. This Provisional Series of maps was published on an Ordnance Survey base at a scale of One Inch to One Mile in the period 1967 to 1974. These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended and can be downloaded from the Natural England [website](#). This data is also available on 'Magic', an interactive, geographical information website <http://magic.defra.gov.uk/>.

Since 1976, selected areas have been re-surveyed in greater detail and to revised



## Agricultural Land Classification: protecting the best and most versatile agricultural land

guidelines and criteria. Information based on detailed ALC field surveys in accordance with current guidelines (MAFF, 1988) is the most definitive source. Data from the former Ministry of Agriculture, Fisheries and Food (MAFF) archive of more detailed ALC survey information (from 1988) is also available on <http://magic.defra.gov.uk/>. Revisions to the ALC guidelines and criteria have been limited and kept to the original principles, but some assessments made prior to the most recent revision in 1988 need to be checked against current criteria. More recently, strategic scale maps showing the likely occurrence of best and most versatile land have been prepared. Mapped information of all types is available from Natural England (see *Further information* below).

### New field survey

Digital mapping and geographical information systems have been introduced to facilitate the provision of up-to-date information. ALC surveys are undertaken, according to the published Guidelines, by field surveyors using handheld augers to examine soils to a depth of 1.2 metres, at a frequency of one boring per hectare for a detailed assessment. This is usually supplemented by digging occasional small pits (usually by hand) to inspect the soil profile. Information obtained by these methods is combined with climatic and other data to produce an ALC map and report. ALC maps are normally produced on an Ordnance Survey base at varying scales from 1:10,000 for detailed work to 1:50 000 for reconnaissance survey

There is no comprehensive programme to survey all areas in detail. Private consultants may survey land where it is under consideration for development, especially around the edge of towns, to allow comparisons between areas and to inform environmental assessments. ALC field surveys are usually time consuming and should be initiated well in advance of planning decisions. Planning authorities should ensure that sufficient detailed site specific ALC survey data is available to inform decision making.

### Consultations

Natural England is consulted by planning authorities on the preparation of all development

plans as part of its remit for the natural environment. For planning applications, specific consultations with Natural England are required under the Development Management Procedure Order in relation to best and most versatile agricultural land. These are for non agricultural development proposals that are not consistent with an adopted local plan and involve the loss of twenty hectares or more of the best and most versatile land. The land protection policy is relevant to all planning applications, including those on smaller areas, but it is for the planning authority to decide how significant the agricultural land issues are, and the need for field information. The planning authority may contact Natural England if it needs technical information or advice.

Consultations with Natural England are required on all applications for mineral working or waste disposal if the proposed afteruse is for agriculture or where the loss of best and most versatile agricultural land agricultural land will be 20 ha or more. Non-agricultural afteruse, for example for nature conservation or amenity, can be acceptable even on better quality land if soil resources are conserved and the long term potential of best and most versatile land is safeguarded by careful land restoration and aftercare.

### Other factors

The ALC is a basis for assessing how development proposals affect agricultural land within the planning system, but it is not the sole consideration. Planning authorities are guided by the National Planning Policy Framework to protect and enhance soils more widely. This could include, for example, conserving soil resources during mineral working or construction, not granting permission for peat extraction from new or extended mineral sites, or preventing soil from being adversely affected by pollution. For information on the application of ALC in Wales, please see below.

## Agricultural Land Classification: protecting the best and most versatile agricultural land

### Further information

Details of the system of grading can be found in: *Agricultural Land Classification of England and Wales: revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

Please note that planning authorities should send all planning related consultations and enquiries to Natural England by e-mail to [consultations@naturalengland.org.uk](mailto:consultations@naturalengland.org.uk). If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Natural England  
Consultation Service  
Hornbeam House  
Electra Way  
Crewe Business Park  
CREWE  
Cheshire  
CW1 6GJ

ALC information for Wales is held by Welsh Government. Detailed information and advice is available on request from Ian Rugg ([ian.rugg@wales.gsi.gov.uk](mailto:ian.rugg@wales.gsi.gov.uk)) or David Martyn ([david.martyn@wales.gsi.gov.uk](mailto:david.martyn@wales.gsi.gov.uk)). If it is not possible to consult us electronically then consultations should be sent to the following postal address:

Welsh Government  
Rhodfa Padarn  
Llanbadarn Fawr  
Aberystwyth  
Ceredigion  
SY23 3UR

Natural England publications are available to download from the Natural England website: [www.naturalengland.org.uk](http://www.naturalengland.org.uk).

For further information contact the Natural England Enquiry Service on 0300 060 0863 or e-mail [enquiries@naturalengland.org.uk](mailto:enquiries@naturalengland.org.uk).

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## **Appendix 3: Soil Profile Logs and Soil Droughtiness Calculations**

Project Number	Project Name	Parcel
	Hill Farm 2, Duns Tew	Red Line Boundary

Date of Survey	Survey Type	Surveyor(s)	Company
22/08/2019	ALC	RM	TOHA

Weather	Relief	Land use and vegetation
Dry, Sunny	Level	LEY (Ley Grass)

Grid Reference	Postcode	Altitude	Area
SP45843002	OX25 6JJ	87	14

MAFF prov	MAFF detailed	Flooding
Grade 3	None	Flood Zone 1 and 3

AAR	AT0	MDw	MDp	FCD	Climate grade
685	1405	103	94	152	1

Bedrock	Superficial deposits
Charmouth Mudstone Formation	Alluvium/None

Soil association(s) 1:250,000	Detailed soil information
Wickham 2	None

Revision Number	Date Revised
2	06/09/2019



Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix		Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn	C	SPL	Drought			Wet		Final ALC						
	NGR	X	Y					Top	Btm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour	%			> 2cm	> 6cm	Type	%	> 2cm	> 6cm	Type	Strength	Size						Shape	No	24	8	2	WC	IV	3b	Limitation 1	Limitation 2	Limitation 3	Grade
12	SP 46200 29900	446200	229900	87				0 35 35	10YR5/3						Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Not Applic	NON - N	NON - N	No	24	8	2	WC IV	3b	Wetness				3b										
								35 90 55	10YR5/3	MP - N 7.5YR5/8				Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								90 120 30						Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
13	SP 46000 29800	446000	229800	89				0 39 39	10YR4/3					No	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Not Applic	NON - N	NON - N	No	26	10	2	WC IV	3b	Wetness				3b											
								39 45 6	10YR5/3	CD - C 7.5YR5/8				Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								45 100 55	10YR6/2	MP - N 7.5YR5/8				Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								100 120 20						Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
14	SP 46100 29800	446100	229800	88				0 35 35	10YR4/3					No	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Not Applic	NON - N	NON - N	No	24	8	2	WC IV	3b	Wetness				3b											
								35 40 5	10YR5/4	FD - Fe 7.5YR5/8				No	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	No																					
								40 90 50	10YR5/2	MP - N 7.5YR5/8				Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								90 100 10	10YR6/1	MP - N 7.5YR5/8				Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								100 120 20						Yes	ZC - Silty	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
15	SP 46200 29800	446200	229800	87				0 30 30	10YR4/3					No	HZCL - Sil	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Not Applic	NON - N	NON - N	No	28	14	2	WC IV	3b	Wetness				3b											
								30 40 10	10YR5/3	CD - C 7.5YR5/8				Yes	HZCL - Sil	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								40 90 50	10YR5/1	MP - N 7.5YR5/8				Yes	C - Clay	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
								90 120 30						Yes	C - Clay	0			HR - All hard rocks or stones (i.e. those which cannot be scratched with	Poor	NON - N	NON - N	Yes																					
END																																												

**Mottle form**

FF - Few Faint  
 FD - Few Distinct  
 FP - Few Prominent  
 CF - Common Faint  
 CD - Common Distinct  
 CP - Common Prominent  
 MF - Many Faint  
 MD - Many Distinct  
 MP - Many Prominent  
 VF - Very many Faint  
 VD - Very many Distinct  
 VP - Very many Prominent

**Texture**

C - Clay  
 CHK - Chalk  
 CS - Coarse Sand  
 CSL - Coarse sandy loam  
 CSZL - Coarse sandy silt loam  
 FP - Fibrous and semifibrous peats  
 FS - Fine Sand  
 FSL - Fine sandy loam  
 FSZL - Fine sandy silt loam  
 HCL - Clay loam (heavy)  
 HP - Humified peats  
 HZCL - Silty clay loam (heavy)  
 IMP - Impenetrable to roots  
 LCS - Loamy Coarse Sand  
 LFS - Loamy fine sand  
 LMS - Loamy medium sand  
 LP - Loamy peats  
 MCL - Clay loam (medium)  
 MS - Medium Sand  
 MSL - Medium sandy loam  
 MSZL - Medium sandy silt loam  
 MZ - Marine Light Silts  
 MZCL - Silty clay loam (medium)  
 OC - Organic clays  
 OL - Organic loams  
 OS - Organic sands  
 PL - Peaty loams  
 PS - Peaty sands  
 SC - Sandy clay  
 SCL - Sandy clay loam  
 SP - Sandy peats  
 ZC - Silty clay  
 ZL - Silt loam

**Stone Type**

CH - Chalk or chalk stones  
 FSST - Soft fine grained sandstones  
 GH - Gravel with non-porous (hard) stones  
 GS - Gravel with porous stones (mainly soft stone types listed above)  
 HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger nail)  
 MSST - Soft, medium or coarse grained sandstones  
 SI - Soft 'weathered' igneous or metamorphic rocks or stones  
 SLST - Soft oolitic or dolomitic limestones  
 ZR - Soft, argillaceous or silty rocks or stones

**Ped. Shape**

SG - Single grain  
 GRA - Granular  
 SAB - Subangular Blocky  
 AB - Angular Blocky  
 PRIS - Prismatic  
 PLAT - Platy  
 MASS - Massive  
 NA - N/A

**Subsoil Structure Condition**

Not Applicable  
 Good  
 Moderate  
 Poor

**Soil or Ped. Strength**

Loose  
 Very friable  
 Friable  
 Firm  
 Very firm  
 Extremely firm  
 Extremely hard  
 N/A

**Calcareousness**

NON - Non-calcareous (<0.5% CaCO<sub>3</sub>)  
 VSC - Very slightly calcareous (0.5 - 1% CaCO<sub>3</sub>)  
 SC - Slightly calcareous (1 - 5% CaCO<sub>3</sub>)  
 MC - Moderately calcareous (5 - 10% CaCO<sub>3</sub>)  
 VC - Very calcareous (>10% CaCO<sub>3</sub>)

**Ped. Size**

VF - Very Fine  
 F - Fine  
 M - Medium  
 C - Coarse  
 VC - Very Coarse  
 NA - N/A

**Degree of Ped. Development**

W - Weak  
 M - Moderate  
 S - Strong  
 NA - Not applicable

**Wetness Class**

WC I  
 WC II  
 WC III  
 WC IV  
 WC V  
 WC VI

**ALC Grades**

1  
 2  
 3a  
 3b  
 4  
 5  
 Non-Ag

**Gley**

None  
 Gley  
 N/A

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## **Appendix 4: Soil Pit Description**



Project	Location	Date	Surveyor(s)	Company
	Hill Farm, Duns Tew, Oxon	21-Aug-19	RM	TOHA

Pit	WC	Grade	Limitation(s)	Notes
1	IV	3b	Wetness	

Grid Ref.			Altitude	Nearest point	Topography				Flora				Weather and conditions			
Square	East	North			Gradient	Aspect	Slope form	Surface	Cultivation type	Vegetation types			Temp	Sky	Wind	Precipitation
SP	461	300	88	AB8	<7°	S	Straight	Level	Ploughed	Arable			Cool	Cloudy	Slight	Dry

Horizon	Depth		Matrix			Gleying			Mottles			Stone content				Calc.	Mn C	Ped/soil structure				Horizon boundary		Biopores	SPL	
	Top	Btm	Texture	Colour	Munsell	Gley	Colour	Munsell	Form	Colour	Munsell	%	H	Type	S			Type	Dev.	Size	Structure	Strength	Distinct			Form
Ap	0	40	ZC	B	10YR4/3	N						0					Non- <del>C</del>	None	Mod	Med	SAB	Firm	Clear	Smooth	>0.5	N
B	40	65	C	GB	10YR5/3	Y	GB	10YR5/3	MD	SB	7.5YR5/8	0					Non- <del>C</del>	None	Poor	Coarse	Angular	Firm	Clear	Smooth	<0.5	Y
C	65	120	C	GB	10YR5/3	Y	GB	10YR5/3	VD	SB	7.5YR5/8	0					Non- <del>C</del>	None	Poor	Coarse	Prismatic	Firm	n/a	n/a	<0.5	Y

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**Appendix 5:**  
**Laboratory Analysis - Topsoil Particle Size Distribution (PSD)**



**ANALYTICAL REPORT**

<b>Report Number</b>	<b>67656-19</b>	<b>N717</b>	<b>Client HILL FARM</b>
<b>Date Received</b>	<b>28-AUG-2019</b>		
<b>Date Reported</b>	<b>03-SEP-2019</b>		
<b>Project</b>	<b>SOIL</b>		
<b>Reference</b>	<b>HILL FARM</b>		
<b>Order Number</b>			

Laboratory Reference		SOIL448071	SOIL448072	SOIL448073						
Sample Reference		HILL FARM 2T	HILL FARM 8T	HILL FARM 15T						
Determinand	Unit	SOIL	SOIL	SOIL						
Sand 2.00-0.063mm	% w/w	12	11	13						
Silt 0.063-0.002mm	% w/w	51	53	54						
Clay <0.002mm	% w/w	37	36	33						
Textural Class **		ZC	ZC	HZCL						

**Notes**

Analysis Notes      The sample submitted was of adequate size to complete all analysis requested.  
 The results as reported relate only to the item(s) submitted for testing.  
 The results are presented on a dry matter basis unless otherwise stipulated.

Document Control      **This test report shall not be reproduced, except in full, without the written approval of the laboratory.**

Reported by      *Myles Nicholson*  
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\*\* Please see the attached document for the definition of textural classes.

## ADAS (UK) Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

For the *sand*, *loamy sand*, *sandy loam* and *sandy silt loam* classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

vf	Very Fine (more than 2/3's of sand less than 0.106 mm)
f	Fine (more than 2/3's of sand less than 0.212 mm)
c	Coarse (more than 1/3 of sand greater than 0.6 mm)
m	Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam* classes according to clay content are indicated as follows:

M	medium (less than 27% clay)
H	heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.