Agricultural Land Classification:

Land to the West of
East Northamptonshire Resource Management Facility,
Kings Cliffe, Northamptonshire

Prepared for:
MJCA

On Behalf of:
Augean South Ltd

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Our interpretation of the site characteristics is based on available data made during our desktop study and soil survey. This desktop study and soil survey has assessed the characteristics of the Study Area in relation to the assessment of its Agricultural Land Classification. It should not be relied on for alternative end-uses or for other schemes. This report has been prepared solely for the benefit of MJCA and Augean South Ltd. 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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1 INTRODUCTION

1.1 Background

1.1.1 This report was commissioned by MJCA on behalf of Augean South Ltd to determine the quality of agricultural land to the west of the East Northamptonshire Resource Management Facility near Kings Cliffe, Northamptonshire, PE8 6XX ('the Study Area'). The assessment was made in accordance with the Agricultural Land Classification (ALC) system for England and Wales (see 'Methodology' below).

1.1.2 The approximately 28.2 hectare (ha) Study Area is located to the northwest of Kings Cliffe, as shown on **Figure 1**. The approximate centre of the Study Area is located at British National Grid (BNG) reference TF 0031 0022.

1.2 Methodology

1.2.1 This report has been prepared by a Chartered Scientist (CSci), who is a Professional Member of the British Society of Soil Science (BSSS). The author meets the requirements of the BBSS Professional Competency Standard (PCS) scheme for ALC (see BSSS PCS Document 2 'Agricultural Land Classification of England and Wales', given as **Appendix A**). The BSSS PCS Standard 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 A also).

1.2.2 This assessment is based upon the findings of a study of published information on climate, geology and soil, in combination with the findings of a detailed soil investigation carried out by the former Ministry of Agriculture, Fisheries and Food (MAFF)[1] in accordance with the national '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').

1.2.3 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 in Paragraph 170 and 171 of the National Planning Policy Framework (NPPF), as revised in February 2019. Further details of the ALC system and national planning policy implications are set out by Natural England in its Technical Information Note 049[2]

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

[2] Natural England (December, 2012). 'Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049)'. Available online @ http://publications.naturalengland.org.uk/publication/35012 Last accessed October 2020

1.3 Structure of the Remainder of this Report

1.3.1 The remainder of this report is structured as follows:

- Section 2 – Planning Policy Framework
- Section 3 – Agricultural Land Classification;
  - Climate;
  - Site (Gradient, Micro-relief, Risk of Flooding);
  - Soil (Geology, Soil Properties);
  - Interactive Limitations (Soil Droughtiness, Soil Wetness);
  - ALC Grading at the Study Area.
- Section 4 - ALC at the Study Area in a Wider Geographical Context;
- Section 5 – Summary and Conclusions

2 PLANNING POLICY FRAMEWORK

2.1 Background

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

2.2 National Planning Policy Statement (NPPF) February 2019

2.2.1 National planning policy guidance on development involving agricultural land is set out in National Planning Policy Framework (NPPF), which was revised on the 19th 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;…' National planning *other benefits of the best and most versatile agricultural land, and of trees and woodland;…'*

2.2.2 Paragraph 171 of the NPPF (2019) goes on to describe that:

'171. Plan should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework[53] …'

2.2.3 Footnote number 53 states that:

'[53] Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.'

2.3 Development Plan Policy

2.3.1 The National Policy Statement for Hazardous Waste (June 2013) contains relevant policy at paragraphs 5.10.6 and 5.10.13 (inter alia), as follows:

'*5.10.6 Applicant should take into account the economic and other benefits of the best and most versatile agricultural land (defined as grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality (grades 3b, 4 and 5) in preference to that of a higher quality*'.

'*5.10.13 The Secretary of State should ensure that justification is provided where applicants site their scheme on best and most versatile agricultural land. The Secretary of State should give little weight to the loss of agricultural land in grades 3b, 4 and 5…*'

2.3.2 Relevant local plan policy is contained in the East Northamptonshire Local Plan adopted in 1996. The local plan contains policy AG1 regards development on agricultural land:

'*Policy AG1*

Planning permission will not normally be granted for proposals involving the use of the best and most versatile agricultural land (Grades 1, 2 and 3a), unless there is no other site suitable for the development.'

2.3.3 The third bullet of Policy 24 in the Northamptonshire Minerals and Waste Local Plan (Adopted July, 2017) states that

'*Policy 24: Restoration and after use*

…sites previously comprising high-grade agricultural land or good-quality forestry use should be restored to the original land use and coupled with a secondary after-use objective…'

2.3.4 There are no specific policies regarding the best and most versatile agricultural land in the(i) North Northamptonshire Joint Core Strategy 2011 – 2031, July 2016, or (ii) The Rural North, Oundle and Thrapston Plan, July 2011. Therefore, consideration should be given to the relevant national and Development Plan guidance and policy set out above.

2.4 Best Practice Guidance

2.4.1 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 CLASSIFICATION

3.1 Background

3.1.1 This section of the report sets out the findings of the Agricultural Land Classification (ALC). It is based on a desktop study of relevant published information on climate, topography, geology and soil, in conjunction with a soil survey.

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

- Climate;
- Site;
- Soil; and
- Interactive limitations.

3.1.3 These factors are considered in turn below.

3.2 Climate

3.2.1 Interpolated climate data relevant to the determination of the Agricultural Land Classification (ALC) grade of land at the Study Area is given in Table 3.1 below.

Table 3.1: ALC Climate Data

Climate Parameter	Data for TF 00312 00223
Average Altitude (m)	82
Average Annual Rainfall (mm)	607
Accumulated Temperature above 0˚C (January – June)	1368
Moisture Deficit (mm) Wheat	106
Moisture Deficit (mm) Potatoes	97
Field Capacity Days (FCD)	123
Grade According to Climate	1

3.2.2 With reference to Figure 1 '*Grade according to climate*' on page 6 of the ALC Guidelines, there is no overall climatic limitation to the quality of agricultural land at the Study Area. This means that agricultural land at the Study Area could be graded as ALC Grade 1 in overall climatic terms, in the absence of any other limiting factor, i.e. site, soil and/or interactive limitations.

3.2.3 Agricultural land at the Study Area is predicted to be at field capacity (i.e. near saturation point) for 123 days per year, mainly over the late autumn, winter and early spring. In combination with topsoil texture will cause an 'interactive limitations' to agricultural land quality at the Study Area, i.e. soil wetness and / or soil droughtiness (see below).

3.3 Study Area

3.3.1 As shown on the location plan given as **Figure 1**, the approximately 28.2 ha Study Area is located to the west of the existing East Northamptonshire Resource Management Facility to the northwest of Kings Cliffe, Northamptonshire. The approximate centre of the Study Area is located at British National Grid (BNG) reference TF 00312 00223.

3.3.2 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.

I. Gradient and Micro-Relief

3.3.3 The Study Area is broadly level at approximately 100 metres (m) Above Ordnance Datum (AOD) at the highest point in the northeast corner of the Study Area, and 82 metres mAOD at the lowest point in the centre of the Study Area. The quality of agricultural land is not limited by gradient (as per Table 1 of the ALC Guidelines, 1988), as the angle of slope does not exceed 7°. Likewise, the quality of agricultural land at the Study Area is not limited by micro-relief, i.e. complex changes in slope angle and direction over short distances.

II. Risk of Flooding

3.3.4 From the Government Flood Map for Planning website[3], the entire Study Area is located in Flood Zone 1, at low risk of flooding by rivers or the sea. However, there is insufficient data/records available to determine if the duration and frequency of flooding is limiting the quality of agricultural land in accordance the ALC Guidelines (1988).

3.4 Soil

I. Geology/Soil Parent Material

3.4.1 British Geological Survey (BGS) information available online[4] has been utilised to identify the Bedrock underlying the Study Area and any Superficial (Drift) Deposits over the Bedrock. This information helps to determine the parent material from which the soil has formed.

[3] Available online @ https://flood-map-for-planning.service.gov.uk/

[4] British Geological Survey 'Geology of Britain Viewer'. Available online @ http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

3.4.2 The BGS information (1:50,000) indicates that Study Area is mainly underlain by Rutland Formation (argillaceous rocks with subordinate sandstone and limestone), with a small area in the south of the Study Area underlain by Lower Lincolnshire Limestone Member (limestone). A small area in the north is underlain by Blisworth Limestone Formation (limestone).

3.4.3 The BGS information (1:50,000) for superficial deposits indicates that the southern part of the Study Area is covered by Till, Mid Pleistocene (diamicton). There are no superficial deposits over the remainder of the Study Area.

II. Published Information on Soil

3.4.4 The Soil Survey of England and Wales (SSEW) soil map of Midland and Western England (Sheet 3) at a scale of 1:250,000 and accompanying Bulletin No. 10 'Soils and their Use in Midland and Western England' (J. M. Ragg *et al*, Harpenden, 1984) reports that agricultural land at the Study Area is covered by soils in the Ragdale Association, with soils in Evesham 1 Association in the east.

3.4.5 As described by the SSEW, the Ragdale Association consists of clayey Ragdale series pelo-stagnogley soils. The Ragdale soils are developed in till which has a grey clayey matrix containing chalk stones, and some lenses of fine loamy material. The dense, clayey slowly permeable subsoils restrict vertical water movement so Ragdale soils are seasonally waterlogged (Wetness Class III and IV) their water regimes varying with climate and the efficiency of drainage measures.

3.4.6 The Evesham 1 Association consists of calcareous clays of variable depth, differing in water regime according to the permeability of the substratum. They are found on Jurassic clays, particularly where they contain limestone bands, in Northamptonshire, Warwickshire, through Gloucestershire into Somerset, and in west Dorset. Evesham series, calcareous pelosols in clay shales, predominate. They are only slowly permeable, but well-developed structures in the topsoil and immediate subsurface horizon lessen the incidence of waterlogging. The soils are seasonally waterlogged when undrained (Wetness Class III).

III. Soil Survey

3.4.7 A log of the 28 soil profiles recorded on Study Area (see **Figure 1**) is given as **Appendix B**. A description of the soil pit (Soil Pit 1, **Figure 1**) is given as **Appendix C**.

3.4.8 The depth of topsoil (calcareous heavy clay loam) in the Subgrade 3a area (see below and Figure 2) is approximately 30cm below ground level. Below the layer of topsoil, the depth of recoverable subsoil (calcareous clay) above the limestone rock is approximately 25cm, i.e. the layer 30cm-55cm below ground level.

3.4.9 The depth of topsoil in the Subgrade 3b area (see below and Figure 2) is approximately 25cm below ground level. Below the layer of topsoil (clay), the depth of recoverable upper subsoil (clay) is approximately 30cm, i.e. the layer 25cm-50cm below ground level. The lower subsoil (clay) extends between 50cm-120cm below ground level.

3.5 Interactive Limitations

3.5.1 From the published information above, together with the findings of the detailed soil survey, it has been determined that the quality of agricultural land in the northern region of the Study Area is limited by soil droughtiness, where the soil profiles are developed over limestone. The clayey soil profiles over the remainder of the Study Area are limited by soil wetness.

I. Soil Droughtiness

3.5.2 As shown in the soil profile logs given as **Appendix B**, moisture balance (MB) calculations for the ALC reference crops (winter wheat and maincrop potatoes) have determined that soil profiles over limestone in the north of the Study Area, i.e. auger bore 1-4, Figure 1, have MB values of between -12mm and -17mm for wheat, and between 12mm and -1mm and for potatoes. The MB value for wheat limits the quality of agricultural land to Subgrade 3a (re Table 8 'Grade according to droughtiness' of the ALC Guidelines).

3.5.3 One auger bore (auger bore 5, Figure 1) has MB values of -29mm for wheat, and -16mm for potatoes. The MB value for wheat limits the quality of agricultural land to Subgrade 3b (re Table 8 'Grade according to droughtiness' of the ALC Guidelines).

II. Soil Wetness

3.5.4 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*'. Agricultural land quality at the Study Area is limited by soil wetness as per Table 3.4 below (based on Table 6 'Grade According to Soil Wetness – Mineral Soils' in the ALC Guidelines):

Table 3.4: ALC Grade According to Soil Wetness

Wetness Class	Texture of the Top 25 cm	<126 Field Capacity Days
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

Key
* <27% clay; and ** >27% clay

3.5.5 Soil profiles on Study Area with clay topsoil, i.e. auger bores 6 to 28, Figure 1, and which are placed in Wetness Class III, are limited by soil wetness to Grade 3b in this climate area (i.e. 123 field capacity days).

3.5 ALC Grading at the Study Area

3.5.1 The ALC survey has determined that the quality of agricultural land at the Study Area is predominantly limited by soil wetness to Subgrade 3b. Some shallow soils developed over limestone in the north of the Study Area are limited by soil droughtiness to Subgrade 3a. The area (ha) and proportion of land in each grade has been measured from **Figure 2** and reported in Table 3.2.

Table 3.5: Agricultural Land Classification – Kings Cliffe, Northamptonshire

ALC Grade	Area (Ha)	Area (%)
Grade 1 (Excellent)	0	0
Grade 2 (Very Good)	0	0
Subgrade 3a (Good)	5.9	20.9
Subgrade 3b (Moderate)	21.8	77.3
Grade 4 (Poor)	0	0
Grade 5 (Very Poor)	0	0
Other Land / Non-agricultural	0.5	1.8
Total	**28.2**	**100.0**

4 ALC AT THE STUDY AREA IN A WIDER GEOGRAPHICAL CONTEXT

4.1 Introduction

4.1.1 The aim of this section is to examine agricultural land quality at the Study Area in a national, regional, county and local context.

4.2 Pre-1988 ALC Information

4.2.1 During the 1960's and 1970's MAFF produced a series of maps to show the provisional ALC grade of agricultural land over the whole of England and Wales at a scale of 1:250,000. These provisional ALC maps are suitable for strategic land use planning only, i.e. they appropriate for land areas greater than 80 ha. The provisional MAFF ALC map of South West England (1:250,000, 1984) indicates that the quality of agricultural land at the Study Area is all Grade 3 (not differentiated between Subgrade 3a and Subgrade 3b) and non-agricultural land. The proportion of agricultural land in each of the ALC grades (derived from MAFF provisional or pre-1988 ALC information) in England, East Midlands Office Government Office, Northamptonshire County, and East Northamptonshire District is shown for comparison in Table 4.1 below.

Table 4.1: Provisional ALC – National, Regional and Local Context (Proportion of ALC Grades as % of Total Land Area)[5]

ALC Grade	England	East Midlands Office	Northamptonshire County	East Northamptonshire District
1 (excellent)	2.7	4.9	0.0	0.0
2 (very good)	14.2	18.5	8.4	9.8
3 (good to moderate)	48.2	56.7	81.4	80.0
4 (poor)	14.1	9.9	3.3	2.2
5 (very poor)	8.4	2.9	0.0	0.0
Non-Agricultural	5.0	2.8	2.9	6.0
Urban	7.3	4.3	3.9	2.1

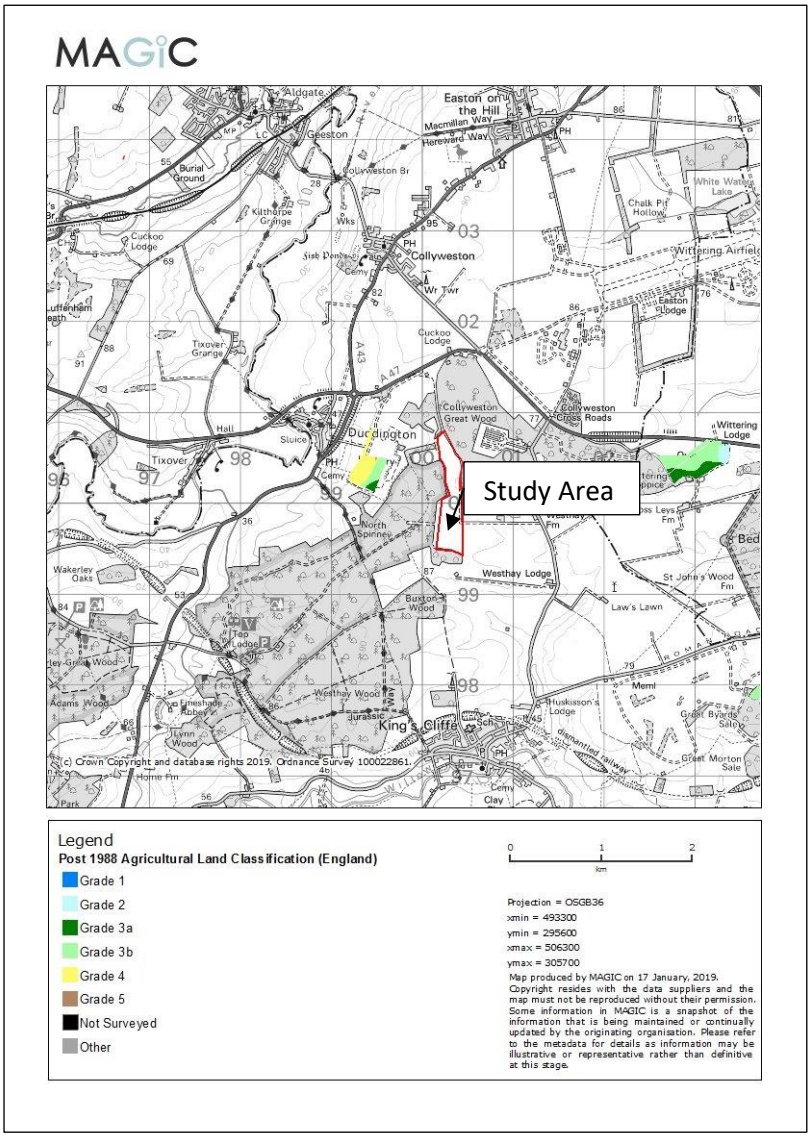
4.2.2 The provisional MAFF ALC information indicates that there is a high proportion of Grade 3 for Northamptonshire (i.e. 81.4%), the East Midlands region as a whole (i.e. 56.7%), and the East

[5] Ministry of Agriculture, Fisheries and Food, Land and Water Service, Technical Notes, Resource Planning (February 1983) 'Agricultural Land Classification of England and Wales – The Distribution of the Grades' (TN/RP/01 TFS 846)

Northamptonshire District (80.0%). Therefore, the predominance of Grade 3 at the Study Area is unsurprising, as Grade 3 agricultural land is widespread in the county.

4.3 Post-1988 ALC Information

4.3.1 The former MAFF has carried a post-1988 ALC survey of agricultural land surrounding Kings Cliffe. An extract from the Post 1988 Agricultural Land Classification map on MAGIC[6] is given below.



4.3.2 As shown from the post 1988 ALC survey carried out by MAFF above, there is Subgrade 3a and 3b to the east and west of the Study Area. Therefore, the presence of Subgrade 3a and 3b agricultural land within the Study Area is typical of the grade of land around Kings Cliffe.

[6] Multi Agency Geographic Information for the Countryside. Post 1988 Agricultural Land Classification. Available online @ www.MAGIC.gov.uk

5 SUMMARY AND CONCLUSIONS

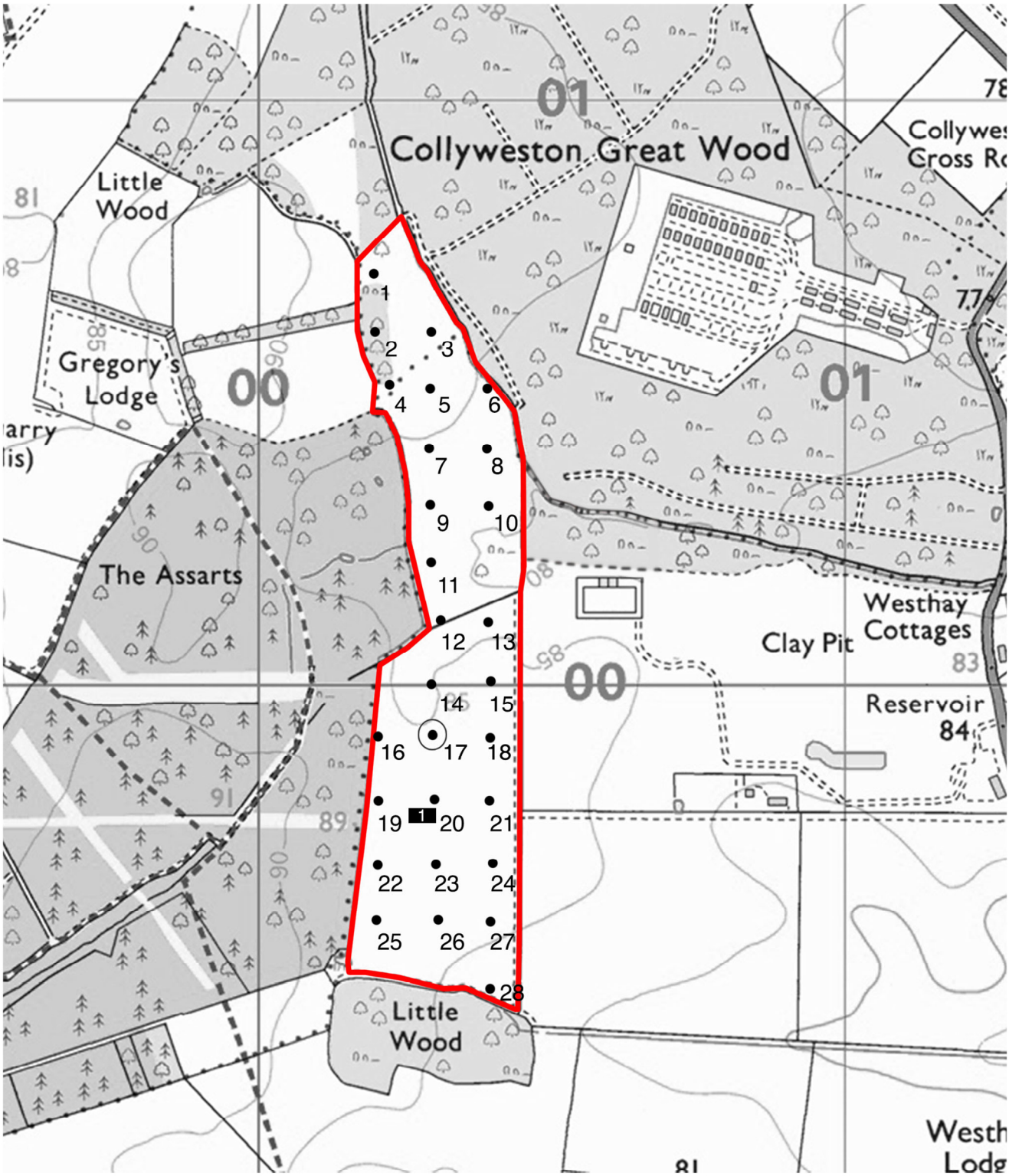
5.1.1 This report was commissioned by MJCA/Augean South Ltd to determine the quality of agricultural land to the West of the East Northamptonshire Resource Management Facility near Kings Cliffe, Northamptonshire, PE8 6XX ('the Study Area'). The assessment was made in accordance with the Agricultural Land Classification (ALC) system for England and Wales.

5.1.2 British Geological Survey (BGS) information (1:50,000) indicates that Study Area is mainly underlain by the Rutland Formation (Argillaceous Rocks With Subordinate Sandstone And Limestone), with smaller areas of Lower Lincolnshire Limestone Member (Limestone) and Blisworth Limestone Formation (Limestone). Most of the bedrock is not covered by superficial deposits, yet the southern region is covered by Till, Mid Pleistocene (Diamicton). As described by the SSEW, the Ragdale Association consists of clayey Ragdale series pelo-stagnogley soils that are seasonally waterlogged (Wetness Class III and IV). The Evesham 1 Association consists of calcareous clays that are seasonally waterlogged when undrained (Wetness Class III).

5.1.3 The ALC survey has determined that the quality of agricultural land at the Study Area is predominantly limited by soil wetness to Subgrade 3b (i.e. 21.8 ha or 77.3%). Some shallow soils developed over limestone in the north of the Study Area are limited by soil droughtiness to Subgrade 3a (i.e. 5.9 ha or 20.9%). The remainder is classed as non-agricultural. This concurs with a MAFF Post 1988 ALC survey of agricultural land surrounding Kings Cliffe, which also determined a mixture of Subgrade 3a and 3b.

5.1.4 The provisional MAFF ALC information indicates that there is a high proportion of Grade 3 for the East Northamptonshire District (80.0%). Therefore, the predominance of Grade 3 at the Study Area is unsurprising, as Grade 3 agricultural land is widespread in the county. Therefore, the predominance of Subgrade 3b with a smaller proportion of Subgrade 3a at the Study Area is unsurprising, as it is widespread in the District.

Figures



Study Area

Auger location

Topsoil Sample

Soil Pit

N

Client

Augean South Ltd

Figure 1

Sample Locations

Project Name

ENRMF Western Extension

Project No C645

Dwg. No 01

Scale NTS

Date 14/10/20

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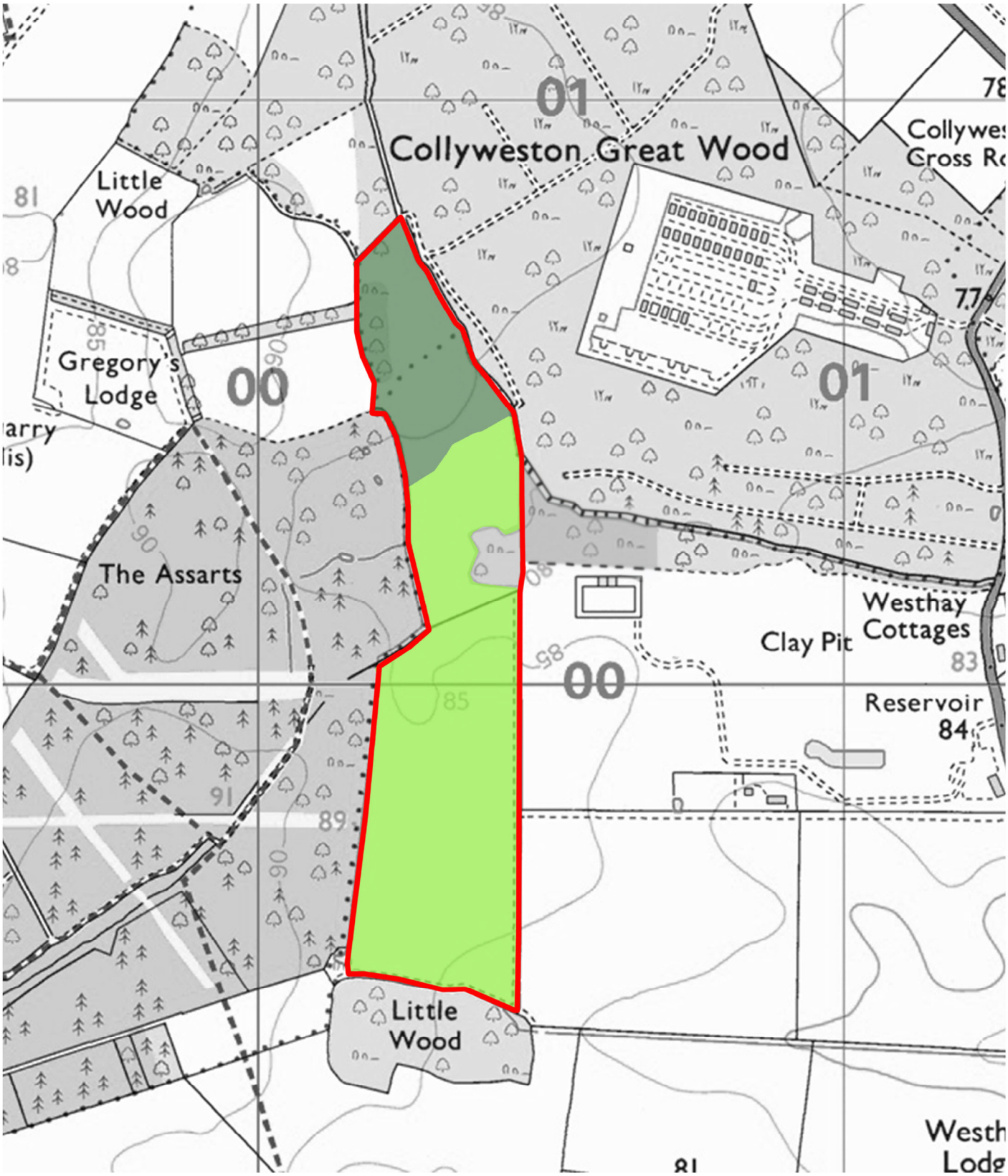

ALC Grade

- Grade 1
- Grade 2
- Subgrade 3a
- Subgrade 3b
- Grade 4
- Grade 5
- Other land

Study Area

N

Client

Augean South Ltd

Project No C645
Dwg. No 01
Scale NTS
Date 14/10/20
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Figure 2:

Agricultural Land Classification

Project Name

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Appendix A:
IPSS Professional Competency Scheme Doc. 2 – Agricultural Land Classification

DOCUMENT 2

Agricultural Land Classification (England and Wales)

Institute of Professional Soil Scientists

Background

The evaluation of land for its agricultural potential in England and Wales[1] is accomplished by application of the Agricultural Land Classification[2] (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[3].

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[1, 2,] and the ability to apply it accurately and consistently in the classification of an area of land

[1] Similar systems are employed in Scotland and Northern Ireland
[2] ALC Revised Guidelines and Criteria for the Grading the Quality of Agricultural Land (MAFF, 1988) and Climatological Datasets for ALC (Met. Office, 1989)
[3] A former Executive Agency of the Ministry of Agriculture , Fisheries and Food (now Defra)

DOCUMENT 2

Agricultural Land classification (England and Wales)

iPSS
Institute of Professional Soil Scientists

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

Disclaimer: The IPSS and BSSS Working With Soils Initiative provides generic advice on the skills and competencies required by persons carrying out work within the scope of each document. The publishers, authors and the organisations participating in this publication accept no liability whatsoever for any errors or omissions contained in this leaflet, or for any loss or damage arising from interpretation or use of the information, or reliance upon the views contained herein.

SUPPORTING ORGANISATIONS

The following organisations have given their support to the Institute of Professional Soil Scientist's Working with Soils Professional Competency Initiative:

iPSS
Institute of Professional Soil Scientists

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

ADAS

afbi Agri-Food and Biosciences Institute

AHDB Agriculture & Horticulture Development Board

AICC Association of Independent Crop Consultants

National Parks Britain's breathing spaces
Parciau Cenedlaethol Prydain
Ùir i ionaid gael lionmhd
Pàircean Nàiseanta na h-Alba
Àiteachan anailachadh bhreatainn

BALI British Association of Landscape Industries

BIAC

CEH Centre for Ecology & Hydrology
Natural Environment Research Council

CIWEM

The co-operative farms

CPRE Campaign to Protect Rural England
Standing up for your countryside

Cresswell
a Hyder Consulting group company

Earthcare Technical

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

ENPAA English National Park Authorities Association

FWAG Farming & Wildlife Advisory Group

Comisiwn Coedwigaeth Cymru
Forestry Commission Wales

Game & Wildlife Conservation Trust

Greenvale AP
Natural choice for fresh potatoes

IAgrE

iema Institute of Environmental Management & Assessment

The James Hutton Institute

Landscape Institute
Inspiring great places

Land Research Associates

defra
Department for Environment Food and Rural Affairs

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LEAF – Linking Environment and Farming – Integrated Farm Management
NIAB TAG
NFU
National Trust
Natural England
Produce World – Growing Trust
Rothamsted Research
Royal Agricultural College
Royal Agricultural Society of England
SAC
Sainsbury's
Salmon & Trout Association
SEPA – Scottish Environment Protection Agency
Society of Biology
Soil Association
SNIFFER – Scotland & Northern Ireland Forum for Environmental Research
The Scottish Government
the Science council
The Wildlife Trusts
Tim O'Hare Associates – Soil & Landscape Consultancy
Topsoil – The Sustainable Choice from British Sugar
Unilever
Llywodraeth Cymru – Welsh Assembly Government
Waitrose
wrap – Working together for a world without waste

Appendix B:
Soil Profile Logs

Project Number	Project Name	Parcel
C645	Hazardous Waste Landfill, Northamptonshire	Application Area

Date of Survey	Survey Type	Surveyor(s)	Company
05/12/2018	ALC	AR	Askew Land & Soil Limited

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

Grid Reference	Postcode	Altitude	Area
TF00310022	PE93QH	82	21

MAFF prov	MAFF detailed	Flooding
Grade 3/Non-Agric.	None	Flood Zone 1

AAR	AT0	MDw	MDp	FCD	Climate grade
607	1368	106	97	123	1

Bedrock	Superficial deposits
Rutland /Lower Linc. /Blisworth Formation	Till Mid Pleistocene/None

Soil association(s) 1:250,000	Detailed soil information
Ragdale/Evesham 1	None

Revision Number	Date Revised
2	28/01/2019

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	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	> 2cm	> 6cm	Type	%	> 2cm	> 6cm	Type	Strength	Size	Shape					MBw	MBp	Gd	WC	Gw	Limitation 1	Limitation 2	Limitation 3	Grade
1	TF 00200	00700	500200	300700	91	≤7		LEY	0	30	30	10YR4/4						HCL - Clay	10	5	0	SLST - Soft oolitic or dolomitic limestones								MC - Moderately ca			-12	12	3a	WC I	2	Droughtiness			3a
									30	70	40	10YR6/6				No		C - Clay	10			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
2	TF 00200	00600	500200	300600	91	≤7		LEY	0	30	30	10YR4/3						HCL - Clay	10	4	0	SLST - Soft oolitic or dolomitic limestones								SC - Slightly calcarec			-16	-3	3a	WC I	2	Droughtiness			3a
									30	50	20	10YR4/4				No		HCL - Clay	10			SLST - Soft oolitic or dolomitic limestones							Moderate	SC - Slig	No	No								
									50	50	0	10YR7/4				No		MSL - Me	50			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
									50	70	20					None		MSL - Me	70			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
3	TF 00300	00600	500300	300600	100	≤7		LEY	0	30	30	10YR4/3						HCL - Clay	20	15	11	SLST - Soft oolitic or dolomitic limestones								MC - Moderately ca			-17	-5	3a	WC I	2	Droughtiness			3a
									30	45	15	10YR4/4				No		C - Clay	10			SLST - Soft oolitic or dolomitic limestones							Moderate	MC - Mo	No	No								
									45	55	10	10YR7/6				No		SCL - San	20			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
									55	75	20					None		SCL - San	70			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
4	TF 00220	00500	500220	300500	91	≤7		LEY	0	30	30	10YR4/3						HCL - Clay	10	6	0	SLST - Soft oolitic or dolomitic limestones								MC - Moderately ca			-12	-1	3a	WC I	2	Droughtiness			3a
									30	50	20	10YR5/4				No		C - Clay	10			SLST - Soft oolitic or dolomitic limestones							Moderate	MC - Mo	No	No								
									50	55	5	10YR7/4				No		MSL - Me	30			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
									55	75	20					None		MSL - Me	70			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
5	TF 00300	00500	500300	300500	88	≤7		LEY	0	28	28	10YR4/3						MCL - Cla	18	5	0	SLST - Soft oolitic or dolomitic limestones								VC - Very calcareous			-29	-16	3b	WC I	1	Droughtiness			3b
									28	45	17	10YR7/6				No		MCL - Cla	25			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No	No								
									45	65	20					None		MCL - Cla	70			SLST - Soft oolitic or dolomitic limestones							Moderate	VC - Ver	No									
6	TF 00400	00500	500400	300500	88	≤7		LEY	0	28	28	10YR4/2						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								SC - Slightly calcarec			18	4	2	WC III	3a	Wetness			3a
									28	40	12	2.5Y5/3	CD - Cı	10YR5/6	CD - Cı	2.5Y6/1	Yes	C - Clay	0										Poor	MC - Moderate	Yes									
									40	120	80	2.5Y6/2	FD - Fe	10YR5/6			Yes	C - Clay	0										Poor	SC - Slightly cal	Yes									
7	TF 00300	00400	500300	300400	88	≤7		LEY	0	30	30	10YR4/3						C - Clay	12	8	5	SLST - Soft oolitic or dolomitic limestones								SC - Slightly calcarec			15	1	2	WC III	3a	Wetness			3a
									30	65	35	2.5Y5/2	CP - Cı	7.5YR5/6			Yes	C - Clay	0										Poor	SC - Slightly cal	Yes									
									65	120	55	5Y5/1	CD - Cı	10YR5/6			Yes	C - Clay	1			SLST - Soft oolitic or dolomitic limestones							Poor	MC - Moderate	Yes									
8	TF 00400	00400	500400	300400	88	≤7		LEY	0	25	25	2.5Y4/2						C - Clay												NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b
									25	46	21	5Y5/3	FF - Fe	5Y6/1			Yes	C - Clay											Poor	NON - Non-cal	Yes									
									46	120	74	5Y5/1					Yes	C - Clay											Poor	NON - Non-cal	Yes									
9	TF 00300	00300	500300	300300	82	≤7		LEY	0	28	28	10YR4/3						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b
									28	60	32	2.5Y5/3	CP - Cı	7.5YR5/6	CD - Cı	2.5Y5/1	Yes	C - Clay	0										Poor	NON - Non-cal	Yes									
									60	120	60	2.5Y7/1	CP - Cı	10YR5/6			Yes	C - Clay	0										Poor	NON - Non-cal	Yes									
10	TF 00400	00300	500400	300300	82	≤7		LEY	0	28	28	10YR4/2	CD - Cı	7.5YR4/6				C - Clay												NON - Non-calcareo			19	5	2	WC III	3b	Wetness			3b
									28	50	22	2.5Y6/1	MP - N	10YR5/8			Yes	C - Clay											Poor	NON - Non-cal	Yes									
									50	120	70	5Y6/1	CP - Cı	10YR5/8			Yes	C - Clay											Poor	NON - Non-cal	Yes									
11	TF 00300	00200	500300	300200	87	≤7		LEY	0	25	25	10YR4/3						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			17	3	2	WC III	3b	Wetness			3b
									25	65	40	2.5Y5/3	MP - N	7.5YR5/6	CD - Cı	5Y5/1	Yes	C - Clay	0										Poor	NON - Non-cal	Yes									
									65	120	55	5Y6/1	CP - Cı	10YR5/6			Yes	C - Clay	0										Poor	MC - Moderate	Yes									

Point	Grid ref. NGR	X	Y	Alt (m)	Slope °	Aspect	Land use	Depth (cm) Top	Bttm	Thick	Matrix Munsell colour	Ochreous Mottles Form	Munsell colour	Grey Mottles Form	Munsell colour	Gley	Texture	Stones - type 1 %	> 2cm	> 6cm	Type	Stones - type 2 %	> 2cm	> 6cm	Type	Ped Strength	Size	Shape	SUBS STR	CaCO3	Mn C	SPL	Drought MBw	MBp	Gd	Wet WC	Gw	Final ALC Limitation 1	Limitation 2	Limitation 3	Grade
12	TF 00300 00100	500300	300100	88	≤7		LEY	0	25	25	10YR4/2						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			16	3	2	WC III	3b	Wetness			3b
								25	35	10	10YR4/3					No	C - Clay	5			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Moderate	NON - N	No		No							
								35	55	20	2.5Y5/3	FP - Fe	7.5YR5/8	CD - Cı	5Y6/1	Yes	C - Clay	5			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Poor	NON - N	No		Yes							
								55	120	65	2.5Y5/3	MP - M	5YR5/8			Yes	C - Clay	5			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Poor		No		Yes							
13	TF 00400 00100	500400	300100	87	≤7		LEY	0	20	20	10YR4/2						C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			16	2	2	WC III	3b	Wetness			3b
								20	55	35	2.5Y5/3	CD - Cı	10YR5/6	CD - Cı	2.5Y5/1	Yes	C - Clay	0										Poor	NON - Non-cal			Yes							
								55	120	65	2.5Y5/3	CD - Cı	5Y5/1	CF - Cc	2.5Y5/6	Yes	C - Clay	0										Poor	NON - Non-cal			Yes							
14	TF 00300 00000	500300	300000	88	≤7		LEY	0	20	20	10YR4/3						C - Clay	5	4	3	HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			14	0	2	WC III	3b	Wetness			3b
								20	60	40	2.5Y6/1	CP - Cı	7.5YR5/6			Yes	C - Clay	0										Poor	NON - Non-cal			Yes							
								60	120	60	5Y5/1	CD - Cı	10YR5/6			Yes	C - Clay	0										Poor	SC - Slightly cal			Yes							
15	TF 00400 00000	500400	300000	87	≤7		LEY	0	26	26	10YR4/2						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			20	6	2	WC III	3b	Wetness			3b
								26	35	9	2.5Y4/3					No	C - Clay	0										Moderate	VSC - Ve	No		No							
								35	50	15	2.5Y5/3	CD - Cı	10YR5/6	CD - Cı	2.5Y6/1	Yes	C - Clay	0										Poor	SC - Slig	No		Yes							
								50	120	70	5Y7/2	FD - Fe	10YR5/6			Yes	C - Clay	0										Poor	MC - Mo	No		Yes							
16	TL 00200 99900	500200	299900	88	≤7		LEY	0	20	20	10YR4/2						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			15	1	2	WC III	3b	Wetness			3b
								20	55	35	2.5Y5/3	CP - Cı	7.5YR5/8	CD - Cı	5Y5/1	Yes	C - Clay	0										Poor	NON - Non-cal			Yes							
								55	120	65	2.5Y5/3	CF - Cc	10YR5/6	CD - Cı	5Y6/1	Yes	C - Clay	1			CH - Chalk or chalk stones							Poor	SC - Slightly cal			Yes							
17	TL 00300 99900	500300	299900	88	≤7		LEY	0	28	28	10YR4/2						C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b
								28	50	22	2.5Y5/3	CD - Cı	10YR5/6	CD - Cı	5Y6/1	Yes	C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Poor	NON - Non-cal			Yes							
								50	120	70	5Y6/1	CD - Cı	7.5YR4/6			Yes	C - Clay	1			CH - Chalk or chalk stones							Poor	MC - Moderate			Yes							
18	TL 00400 99900	500400	299900	87	≤7		LEY	0	25	25	10YR4/2						C - Clay	5	4	3	HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			15	1	2	WC III	3b	Wetness			3b
								25	60	35	5Y6/1	MP - M	7.5YR5/8			Yes	C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Poor	NON - Non-cal			Yes							
								60	120	60	5Y5/1	MD - M	7.5YR4/6			Yes	C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with							Poor	SC - Slightly cal			Yes							
19	TL 00200 99800	500200	299800	91	≤7		LEY	0	26	26	10YR4/2						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			17	3	2	WC III	3b	Wetness			3b
								26	55	29	2.5Y6/3	CP - Cı	7.5YR5/6			Yes	C - Clay	0										Poor	NON - N	Yes		Yes							
								55	120	65	5Y5/1	CD - Cı	10YR5/6			Yes	C - Clay	1			CH - Chalk or chalk stones							Poor	NON - Non-cal			Yes							
20	TL 00300 99800	500300	299800	91	≤7		LEY	0	28	28	10YR4/2						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b
								28	50	22	2.5Y5/3	MP - M	7.5YR5/6			Yes	C - Clay	0										Poor	NON - N	Yes		Yes							
								50	120	70	5Y5/1	CD - Cı	10YR4/6			Yes	C - Clay	1			CH - Chalk or chalk stones							Poor	SC - Slightly cal			Yes							
21	TL 00400 99800	500400	299800	89	≤7		LEY	0	25	25	10YR4/2						C - Clay	5	4	2	HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			16	2	2	WC III	3b	Wetness			3b
								25	60	35	2.5Y5/3	CP - Cı	7.5YR5/6	CD - Cı	2.5Y6/1	Yes	C - Clay	0										Poor	NON - Non-cal			Yes							
								60	120	60	5Y5/1	CD - Cı	10YR5/6			Yes	C - Clay	0.5			CH - Chalk or chalk stones							Poor	SC - Slightly cal			Yes							
22	TL 00200 99700	500200	299700	91	≤7		LEY	0	26	26	10YR4/2						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b

Point	Grid ref. NGR	X	Y	Alt (m)	Slope °	Aspect	Land use	Depth (cm) Top	Bttm	Thick	Matrix Munsell colour	Ochreous Mottles Form	Munsell colour	Grey Mottles Form	Munsell colour	Gley	Texture	Stones - type 1 %	> 2cm	> 6cm	Type	Stones - type 2 %	> 2cm	> 6cm	Type	Ped Strength	Size	Shape	SUBS STR	CaCO3	Mn C	SPL	Drought MBw	MBp	Gd	Wet WC	Gw	Final ALC Limitation 1	Limitation 2	Limitation 3	Grade
								26	60	34	2.5Y5/2	MP - M	7.5YR5/6			Yes	C - Clay	0											Poor	NON - Non-cal		Yes									
								60	120	60	2.5Y6/2	MD - M	10YR5/6			Yes	C - Clay	1			CH - Chalk or chalk stones								Poor	MC - Moderate		Yes									
23	TL 00300	99700	500300	299700	91	≤7		LEY	0	22	22	10YR4/2						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			16	2	2	WC III	3b	Wetness			3b
								22	60	38	2.5Y5/2	MP - M	7.5YR5/6			Yes	C - Clay	0											Poor	NON - Non-cal		Yes									
								60	120	60	2.5Y6/1	CP - Co	10YR5/6			Yes	C - Clay	0.5			CH - Chalk or chalk stones								Poor	SC - Slightly cal		Yes									
24	TL 00400	99700	500400	299700	89	≤7		LEY	0	28	28	10YR4/2						C - Clay	4			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			12	0	2	WC III	3b	Wetness			3b
								28	45	17	2.5Y5/3	CP - Co	7.5YR5/6			Yes	C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with								Poor	NON - Non-cal		Yes									
								45	120	75	2.5Y5/3	CD - Co	10YR5/6			Yes	C - Clay	10			HR - All hard rocks or stones (i.e. those which cannot be scratched with								Poor	SC - Slightly cal		Yes									
25	TL 00200	99600	500200	299600	91	≤7		LEY	0	28	28	10YR4/2						C - Clay	2			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			18	4	2	WC III	3b	Wetness			3b
								28	65	37	2.5Y5/1	MP - M	7.5YR5/6			Yes	C - Clay	1			HR - All hard rocks or stones (i.e. those which cannot be scratched with								Poor	NON - Non-cal		Yes									
								65	120	55	5Y5/1	MD - M	10YR4/6			Yes	C - Clay	1			CH - Chalk or chalk stones								Poor	SC - Slightly cal		Yes									
26	TL 00300	99600	500300	299600	91	≤7		LEY	0	30	30	10YR4/2						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			19	5	2	WC III	3b	Wetness			3b
								30	60	30	2.5Y5/3	CP - Co	7.5YR5/6	CD - Co	2.5Y6/1	Yes	C - Clay	0											Poor	NON - Non-cal		Yes									
								60	120	60	2.5Y6/1	CP - Co	10YR5/6			Yes	C - Clay	0.5			CH - Chalk or chalk stones								Poor	SC - Slightly cal		Yes									
27	TL 00400	99600	500400	299600	86	≤7		LEY	0	28	28	10YR4/3						C - Clay	3			HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			20	6	2	WC III	3b	Wetness			3b
								28	35	7	10YR4/4					No	C - Clay	0											Moderate	NON - N	No	No									
								35	60	25	2.5Y5/3	MP - M	7.5YR5/6	CD - Co	2.5Y5/1	Yes	C - Clay	0											Poor	SC - Slig	No	Yes									
								60	120	60	2.5Y5/3	CD - Co	10YR5/6	CD - Co	2.5Y5/1	Yes	C - Clay	1			CH - Chalk or chalk stones								Poor	MC - Mo	No	Yes									
28	TL 00400	99500	500400	299500	86	≤7		LEY	0	26	26	10YR4/2						C - Clay	4	3	2	HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger na								NON - Non-calcareo			16	2	2	WC III	3b	Wetness			3b
								26	55	29	2.5Y5/3	MP - M	7.5YR5/6			Yes	C - Clay	0											Poor	NON - Non-cal		Yes									
								55	120	65	2.5Y5/3	CD - Co	10YR5/6	CD - Co	2.5Y5/1	Yes	C - Clay	3			SLST - Soft oolitic or dolomitic limestones								Poor	VC - Very calca		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% $CaCO_3$)
VSC - Very slightly calcareous (0.5 - 1% $CaCO_3$)
SC - Slightly calcareous (1 - 5% $CaCO_3$)
MC - Moderately calcareous (5 - 10% $CaCO_3$)
VC - Very calcareous (>10% $CaCO_3$)

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

Appendix C:
Soil Pit Description

Project	Location	Date	Surveyor(s)	Company
C645	Duddington, Northants	21 Jan 2019	AR	Askew Land and Soil

Pit	WC	Grade	Limitation(s)	Notes
At AB 20	III	3b	WW	SS structure slightly adherent, peds only partly separating cleanly, hence weakly developed assessment. Gleyed ped faces, 2.5Y6/1 and 6/2

Grid Ref.			Altitude	Nearest	Topography				Flora		Weather and conditions			
Square	East	North		point	Gradient	Aspect	Slope form	Surface	Culivation type	Vegetation types	Temp	Sky	Wind	Precipitation
TL	00299	99802		At AB 20	1o	NW	flat	firm seedbe	Prob Min-till	Winter beans	5o	clear	light	none

Horizon	Depth		Matrix			Gleying			Mottles			Stone content					Calc.	Mn C	Ped/soil structure				Horizon boundary		Biopores	SPL
	Top	Bttm	Texture	Colour	Munsell	Gley	Colour	Munsell	Form	Colour	Munsell	%	H	Type	S	Type			Dev.	Size	Structure	Strength	Distinct	Form		
1	0	28	Clay	10YR4/2								3		Hard rock			NC	None					clear	wavy		
2	28	55	Clay	2.5Y5/3					MPON		7.5YR5/6	0					NC	None	Weak	Coarse	Angular blocky	Firm			<0.5	Yes