



Agricultural Land Classification:

Land at Junction 10, M40

Prepared for:

Albion Land

Prepared by:

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Askew Land & Soil Limited

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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 site 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 Albion Land.

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1 INTRODUCTION

1.1 Background

- 1.1.1 This report was commissioned by Albion Land to determine the quality of agricultural land proposed for logistics-based development at Junction 10, M40, OX27 7SS. The assessment was made in accordance with the Agricultural Land Classification (ALC) system for England and Wales (see 'Methodology' below). The ALC 'Study Area' comprises approximately 42.7 hectares (ha) to the west of the A43, and approximately 23.6ha to the east, as shown on **Figure 1**.
- 1.1.2 The approximately 66.3ha Study Area is located approximately north-west of Bicester, Oxfordshire. The approximate centre of the Study Area is located at British National Grid (BNG) reference SP 54672 28861. For the purpose of the ALC survey and reporting, the Study Area has been normally divided into three parcels, i.e., Parcels A, B and C, containing approximately 20 auger-bore locations each (see Figure 1).

1.2 Competency

- 1.2.1 The work has been carried out by a Chartered Scientist (CSci), who is a Fellow (F.I. Soil Sci) of the British Society of Soil Science (BSSS). The soil surveyor meets the requirements of the BSSS Professional Competency Standard (PCS) scheme for ALC (see BSSS PCSS Document 2 '*Agricultural Land Classification of England and Wales*'¹). The BSSS PCS 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).

1.3 Methodology

- 1.3.1 This assessment is based upon the findings of a study of published information on climate, geology and soil in combination with a soil investigation carried out in accordance with the Ministry of Agriculture, Fisheries and Food (MAFF)² '*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').
- 1.3.2 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

¹ British Society of Soil Science. Professional Competency Scheme Document 2 '*Agricultural Land Classification of England and Wales*'.

Available online @ <https://www.soils.org.uk/sites/default/files/events/flyers/ipss-competency-doc2.pdf> Last accessed September 2021

² The Ministry of Agriculture, Fisheries and Food (MAFF) was incorporated within the Department for Environment, Food and Rural Affairs (Defra) in June 2001

land classified as Grade 1, 2 and Subgrade 3a falls in the '*best and most versatile*' category in Paragraphs 174 and 175 of the National Planning Policy Framework (NPPF) revised on 20th July 2021. Further details of the ALC system and national planning policy implications are set out by Natural England in Technical Information Note 049³.

- 1.3.3 A detailed soil survey and ALC of the Study Area was carried out in June 2021. The ALC survey involved examination of the soil's physical properties at 64 auger-bore locations at a sampling density of approximately 1 auger bore per 1 ha. The soil profile was examined at each sample location to a maximum depth of approximately 1.2 m by hand with the use of a 5cm diameter Dutch (Edleman) soil auger. Two soil pits, i.e., Pit 1 and Pit 2, were excavated by hand with a spade in order to examine certain soil physical properties, such as stone content and the structural condition of the subsoil, more closely. The locations of the auger bores and the soil pit is shown on **Figure 1**.
- 1.3.4 The auger-bore 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. Where auger locations on a 100 m grid pattern fall on headland, tramlines, or within 3 m of a hedgerow or tree, they were relocated on agricultural land close by, i.e., to avoid compacted ground or land affected by tree roots, etc.
- 1.3.5 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.
- 1.3.6 The texture of the topsoil and subsoil was determined by hand-texturing, as described in Natural England's Technical Information Note 037 'Soil Texture'⁴. To confirm the texture of topsoil hand-textured in the field, a sample of topsoil was collected at auger-bore locations 1 and 2, as shown on **Figure 1**. The samples were sent to an accredited laboratory for particle size analysis, i.e., the proportions of sand, silt and clay. This is to determine the definitive texture class of the topsoil, especially with regard to distinguishing between medium clay loams (i.e., <27% clay) and heavy clay loams (27% to 35% clay).

1.4 Structure of the Remainder of this Report

1.4.1 The remainder of this report is structured as follows:

- Section 2 – Planning Policy Framework
- Section 3 – Agricultural Land Classification;
- Section 4 - ALC at the Study Area in a Wider Geographical Context;
- Section 5 – Summary and Conclusions

³ 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 September 2021

⁴ Natural England's Technical Information Note 037 'Soil Texture'. Available online at <http://publications.naturalengland.org.uk/publication/32016> Last accessed September 2021

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) July 2021

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 20th July 2021. 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 174 (page 50) is of relevance to this assessment of agricultural land quality and soil and states that:

'174...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;...'

2.2.2 Paragraph 175 of the NPPF (2021) goes on to describe that:

'175. 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 Framework⁵³ ...'

2.2.3 Footnote number 58 states that:

'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 Best Practice Guidance

2.3.1 The Department for Environment, Food and Rural Affairs (Defra) has published a 'Code of Practice for the Sustainable Use of Soils on Construction Sites'⁵.

⁵ Department for Environment, Food and Rural Affairs (September, 2009) 'Code of Practice for the Sustainable Use of Soils on Construction Sites'. Available online @ <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>. Last accessed September 2021

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 in the Study Area is given in the Tables below.

Table 3.1: ALC Climate Data for land at Junction 10, M40	
Climate Parameter	Grid Ref: SP 54672 28861
Average Altitude (m)	117
Average Annual Rainfall (mm)	687
Accumulated Temperature above 0°C (January – June)	1369
Moisture Deficit (mm) Wheat	98
Moisture Deficit (mm) Potatoes	88
Field Capacity Days (FCD)	149
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 in the Study Area. This means that agricultural land in the Study Area could be graded as high 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 in the Study Area is predicted to be at field capacity (i.e., near saturation point) for 149 days per year, mainly over the late autumn, winter and early spring. The combination of topsoil texture, drainage status (Wetness Class) of the profile, and number of FCD affects the degree to which agricultural land is limited by soil wetness. The climate in the Study Area falls in the 126 – 175 FCD category for assessing the ALC grade according to soil wetness (regarding Table 6 of the ALC Guidelines), as described in more detail under ‘interactive limitations’ below.

3.3 Study Area

- 3.3.1 The approximately 66 ha Study Area is located in Cherwell District approximately 0.5km to the north-east of Ardley, Oxfordshire. The Study Area comprises two parcels of land currently in agricultural use to the north of Junction 10 of the M40. The two parcels are separated to the east and west by the A43. The approximate centre of the Study Area is located at British National Grid (BNG) reference SP 54672 28861. The location and boundaries of the Study Area are shown on **Figure 1**.

- 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 located on a south-east facing slope, with the highest elevation in the west at approximately 130 metres (m) Above Ordnance Datum (AOD), and the lowest elevation in the east at approximately 110 mAOD. The quality of agricultural land in the Study Area is not limited by gradient, as the gradient of the slope does not exceed 7° (see Table 1 of the ALC Guidelines, 1988). Likewise, the quality of agricultural land 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 website⁶, the Study Area is located in Flood Zone 1. The land is not limited by a risk of flooding (re Table 2 ‘Grade according to flood risk in summer’ and/or Table 3 ‘Grade according to flood risk in winter’ of the ALC Guidelines).

3.4 Soil

I. Geology/Soil Parent Material

⁶ Government Flood Map for Planning. Available online @ <https://flood-map-for-planning.service.gov.uk/confirm-location?eastings=454700&northing=272400&nationalGridReference=SP547724> Last accessed September 2021

- 3.4.1 British Geological Survey (BGS) information available online⁷ 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 material⁸ from and within which a soil has formed.
- 3.4.2 The BGS information (1:50,000) indicates that Study Area is entirely underlain by White Limestone Formation (Limestone). The bedrock is not covered by any superficial deposits, apart from a small region of Head (clay, silt, sand and gravel) in the western field.

II. Published Information on Soil

- 3.4.3 Published information on soil in the Study Area has been sourced from a National Soil Resource Institute (NSRI) soil report covering the Study Area⁹. The NSRI Soil Report shows how most of the Study Area is covered by soils grouped in the Abberford Association.
- 3.4.4 As described on the NSRI Landis Soil Guide online¹⁰, the Aberford Association consist of brown calcareous earths. These soils are fine loamy with a characteristic brown subsoil over limestone at 40 to 50 cm depth. Stoniness varies with the hardness of the underlying rock but normally increases down the profile. This Association comprises permeable and well drained soils in Wetness Class I, although minor drainage is required where thin mudstones or clay shales outcrop.

III. Soil Survey

- 3.4.5 From the detailed soils survey, it was determined that the topsoil is red (Munsell colour 7.5YR 4/4) to red (7.5YR4.6), slightly stony (approximately 6% stones), calcareous, sandy silt loam/medium clay loam and heavy clay loam (see laboratory analysis of topsoil Particle Size Distribution (PSD) below). The subsoil is dusky red (Munsell colour 7.5YR 3/2), Reddish brown (Munsell colour 5YR4/4) to dark yellowish brown (10YR3/4), calcareous, heavy clay loam to clay. The subsoil is slightly stony (soft oolitic or dolomitic limestones), and the depth to an impenetrable layer of weathered slate is approximately 40cm. The profiles are mainly well drained (Wetness Class I). One soil profile (auger-bore 48) comprises slowly permeable and seasonally waterlogged clay in Wetness Class III.
- 3.4.6 A log of the soil profiles recorded in the Study Area (see Figure 1) is given as **Appendix 1**. A description of one soil pit (soil Pit 1) is given as **Appendix 2**.

⁷ British Geological Survey 'Geology of Britain Viewer'. Available online @ <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html> Last accessed September 2021

⁸ British Geological Survey. A 'parent material' is a soil-science name for a weathered rock or deposit from and within which a soil has formed. In the UK, parent materials provide the basic foundations and building blocks of the soil, influencing their texture, structure, drainage and chemistry. Available online @ [Soil Parent Material Model - British Geological Survey \(bgs.ac.uk\)](http://www.bgs.ac.uk/soil-parent-material-model/) Last accessed Sep 2021

⁹ National Soil Resources Institute (2021), Soil Site Report, National Soil Resources Institute, Cranfield University. Available online @ <https://www.landis.org.uk/sitereporter>. Accessed on 6th August 2021

¹⁰ National Soil Resource Institute/Cranfield University 2021. *The Soils Guide*. Available: www.landis.org.uk. Cranfield University, UK. Last accessed September 2021

IV. Topsoil Particle Size Analysis

3.4.7 As described earlier in ‘Methodology’, to substantiate topsoil texture determined during the ALC survey by hand-texturing, two samples of topsoil were collected over the Study Area, i.e., auger bore locations 34 (B) and 50 (C), as shown in **Figure 1**. The four topsoil samples were sent to an accredited laboratory for analysis of particle size distribution (PSD), based on the British Standard Institution particle size grades. The certificate of analysis is provided as **Appendix 3**. The findings of the PSD analysis are shown in Table 3.2 below:

Table 3.2: Topsoil Texture (re Table 10, ALC Guidelines)				
Topsoil Sample Location (See Fig. 1)	% sand 0.063-2.0 mm	% silt 0.002- 0.063 mm	% clay <0.002 mm	ALC Soil Texture Class
34 (Area B)	36	47	17	Sandy Silt Loam (borderline Medium Clay Loam)
50 (Area C)	33	30	37	Clay

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 Study Area is limited mainly by soil droughtiness, as described below.

I. Soil Droughtiness

3.5.2 From the ALC Guidelines, a soil droughtiness limitation exists ‘*in areas with relatively low rainfall or high evapotranspiration, or where the soil holds only small reserves of moisture available to plant roots.*’ The ALC grade according to soil droughtiness is shown in Table 3.4 below (based on Table 8 ‘Grade According to Droughtiness’ in the ALC Guidelines). To be eligible for Grades 1 to 3b the moisture balances (MBs) must be equal to, or exceed, the stated minimum values for both wheat and potatoes. If the MB for either crop is less (i.e., more negative) than that shown for Subgrade 3b, the soil is Grade 4 on droughtiness):

Table 3.4: ALC Grade According to Soil Droughtiness		
Grade/Subgrade	Moisture Balance (MB) Limits (mm)	
	Wheat	Potatoes
1	+30	+10
2	+5	-10
3a	-20	-30
3b	-50	-55
4	<-50	<-55

3.5.3 The grade according to soil droughtiness per auger log is shown in **Appendix 1**. The well-drained soil profiles are limited by soil droughtiness to a mixture of Subgrade 3a, and Subgrade 3b where the profiles are moderately stony (brashy) and/or shallow over limestone bedrock.

3.6 ALC Grading of the Study Area

3.6.1 The area of land in each ALC grade has been measured from **Figure 2** and the area (ha) and proportion (% of Site) is given in Table 3.5.

ALC Grade	West Area (Ha)	East Area (%)	Total Study Area (Ha)	Area (%)
Grade 1 (Excellent)	0	0	0	0
Grade 2 (Very Good)	0	0	0	0
Subgrade 3a (Good)	19.0	4.1	23.1	34.8
Subgrade 3b (Moderate)	23.7	19.5	43.2	65.2
Grade 4 (Poor)	0	0	0	0
Grade 5 (Very Poor)	0	0	0	0
Other Land / Non-agricultural	0	0	0	0
Total	42.7	23.6	66.3	100

4 ALC IN 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 in 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 Eastern England (1:250,000, 1984) indicates that the quality of agricultural land in the Study Area is Grade 3. The proportion of agricultural land in each of the ALC grades (derived from MAFF provisional or pre-1988 ALC information) in England, South-Eastern region, Oxfordshire County, and Cherwell District is shown for comparison in Table 4.1 below.

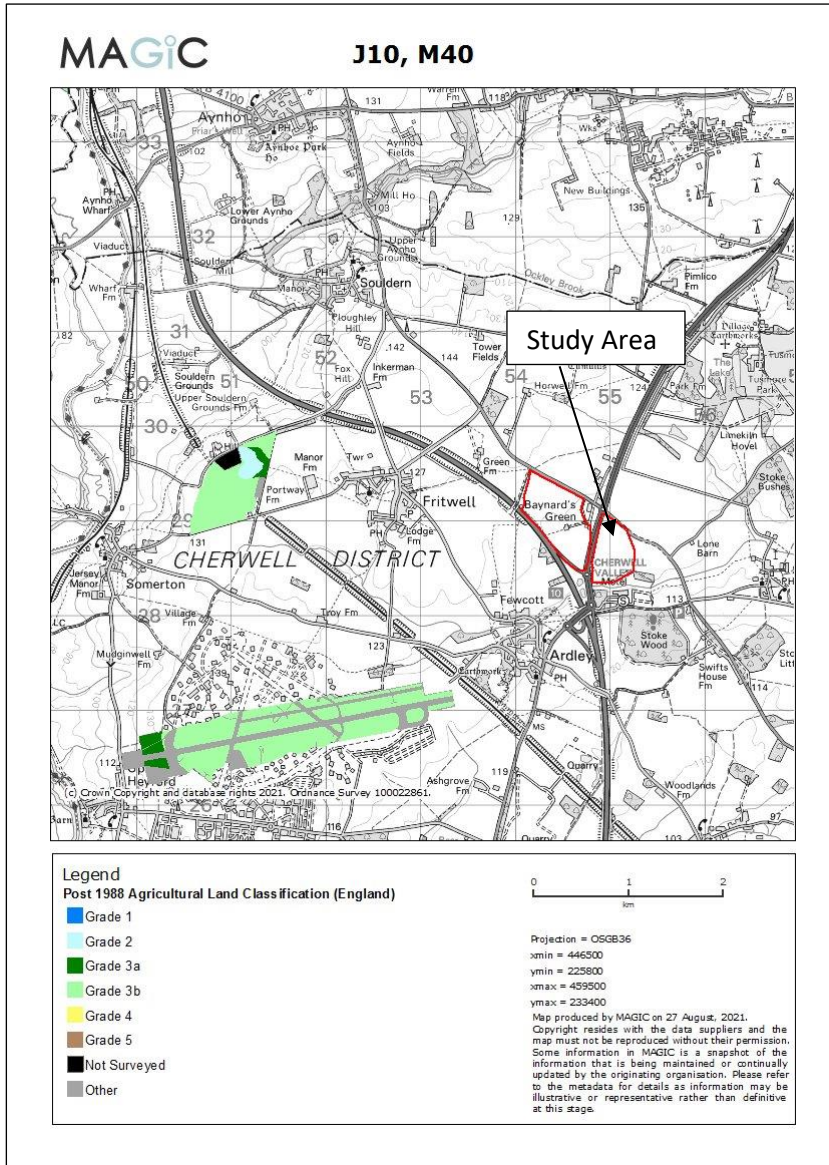
ALC Grade	England	South East Region	Oxfordshire County	Cherwell District
1 (excellent)	2.7	2.5	0.5	0.0
2 (very good)	14.2	10.4	19.6	15.9
3 (good to moderate)	48.2	52.4	54.4	51.1
4 (poor)	14.1	16.1	19.3	26.9
5 (very poor)	8.4	1.3	0.4	1.6
Non-Agricultural	9.6	4.6	2.7	2.0
Urban	7.3	7.7	3.1	2.5

4.2.2 Of note, the provisional (Pre 1988) ALC information shows that Cherwell District has a high proportion of agricultural land in Grade 3, i.e., 51.1% compared with 48.2% in England as a whole. Therefore, the presence of Grade 3 land in the Study Area is unsurprising, as it is widespread in the District.

¹¹ 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)

4.3 Post-1988 ALC Information

4.3.1 The former MAFF has not carried a Post-1988 ALC survey of agricultural land in the Study Area. An extract from the Post-1988 Agricultural Land Classification map online¹² surrounding the Study Area is given below.



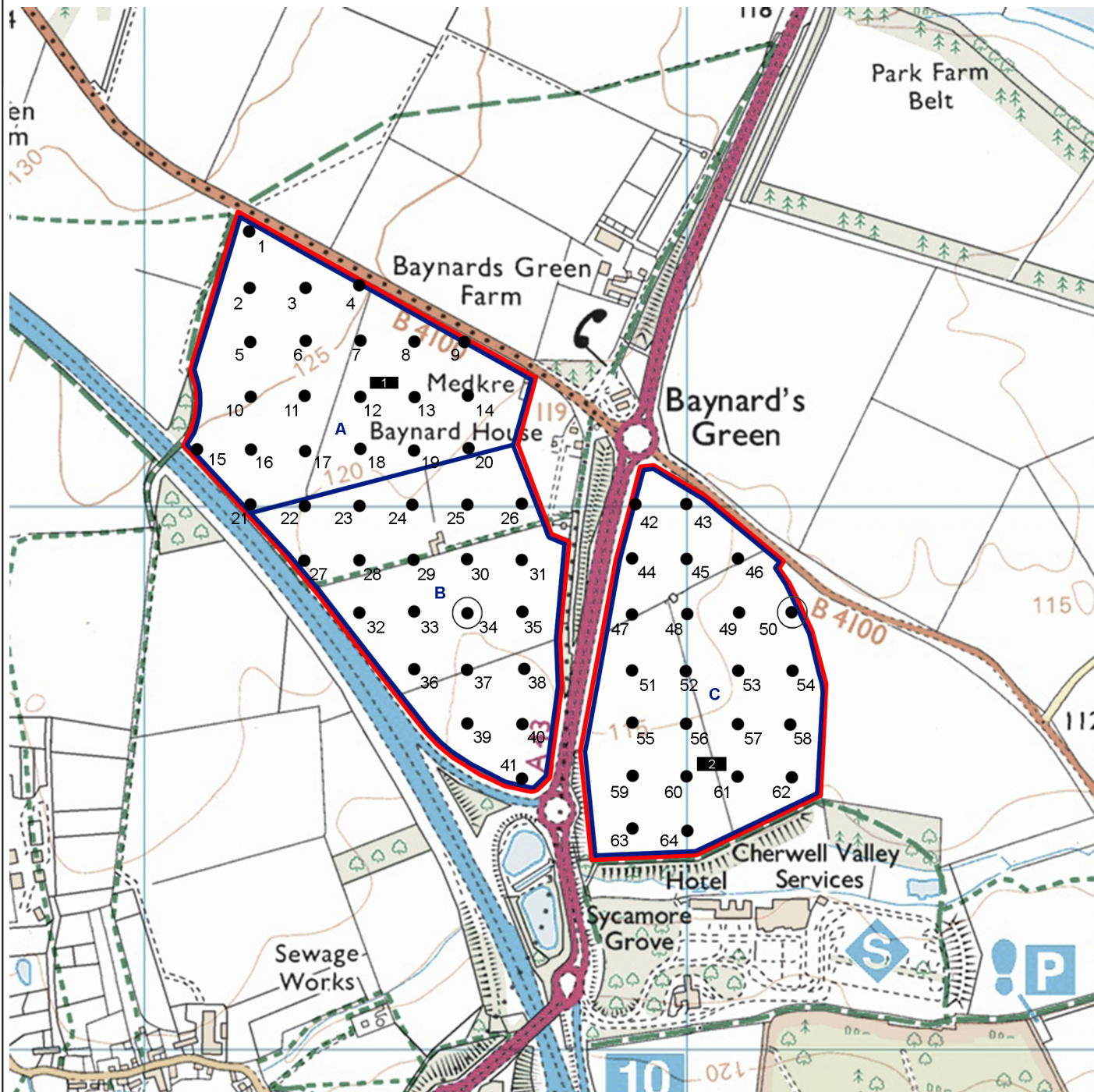
4.3.2 As shown on the Post-1988 ALC survey above, MAFF determined that there is a mix of Grade 2, Subgrade 3a and Subgrade 3b to the west, and mainly Subgrade 3b at the former RAF Upper Heyford airfield to the south-west.

¹² Multi Agency Geographic Information for the Countryside. Post 1988 Agricultural Land Classification. Available online @ www.MAGiC.gov.uk Last accessed September 2021

5 SUMMARY AND CONCLUSIONS

- 5.1.1 This report was commissioned by Albion Land to determine the quality of agricultural land proposed for logistics-based development at Junction 10, M40, OX27 7SS ('the Site'). The assessment was made in accordance with the Agricultural Land Classification (ALC) system for England and Wales (see 'Methodology' below). The approximately 66 hectare (ha) Site is located approximately 0.5km to the north-east of Ardley, Oxfordshire. The approximate centre of the Site is located at British National Grid (BNG) reference SP 54672 28861.
- 5.1.2 British Geological Survey (BGS) information available online has been utilised to identify the Bedrock underlying the Site and any Superficial (Drift) Deposits over the Bedrock. This information helps to determine the parent material from and within which a soil has formed. The BGS information (1:50,000) indicates that Site is entirely underlain by White Limestone Formation (Limestone). The bedrock is not covered by any superficial deposits, apart from a small region of Head (clay, silt, sand and gravel) in the western field.
- 5.1.3 The National Soil Map (1:250,000) shows the Site is covered by soils in the Aberford Association. These soils are fine loamy with a characteristic brown subsoil over limestone at 40 to 50 cm depth. Stoniness varies with the hardness of the underlying rock but normally increases down the profile. This Association comprises permeable and well drained soils in Wetness Class I, although minor drainage is required where thin mudstones or clay shales outcrop.
- 5.1.4 From the detailed soils survey, it was determined that the topsoil is red (Munsell colour 7.5YR 4/4) to red (7.5YR4.6), slightly stony (approximately 6% stones), calcareous, sandy silt loam/medium clay loam and heavy clay loam (see laboratory analysis of topsoil Particle Size Distribution (PSD) below). The subsoil is dusky red (Munsell colour 7.5YR 3/2), Reddish brown (Munsell colour 5YR4/4) to dark yellowish brown (10YR3/4), calcareous, heavy clay loam to clay. The subsoil is slightly stony (soft oolitic or dolomitic limestones), and the depth to an impenetrable layer of weathered slate is approximately 40cm. The profiles are mainly well drained (Wetness Class I). One soil profile (auger-bore 48) comprises slowly permeable and seasonally waterlogged clay in Wetness Class III.
- 5.1.5 The detailed ALC survey has determined that agricultural land in the Study Area is limited by soil droughtiness to Subgrade 3a (i.e., 23.1ha, or 34.8% of the Study Area), or Subgrade 3b (i.e., 43.2ha, or 65.2% of the Study Area) where the profiles are moderately stony (brashy) and/or shallow over limestone bedrock.
- 5.1.6 Development of the predominantly Subgrade 3b land within the Study Area (i.e., approximately two-thirds, or 65.2%) does not significantly harm national agricultural interests in the NPPF (2021), as the Subgrade 3b represents some of the poorest quality land available in the District.

Figures



Site Parcel



ALC Survey Area



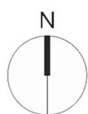
Auger location



Topsoil Sample



Soil Pit



Client

Albion Land

Project No C792

Dwg. No 01

Scale NTS

Date 24/08/2021

Drawn By ELA

Figure 1

Sample Locations

Project Name

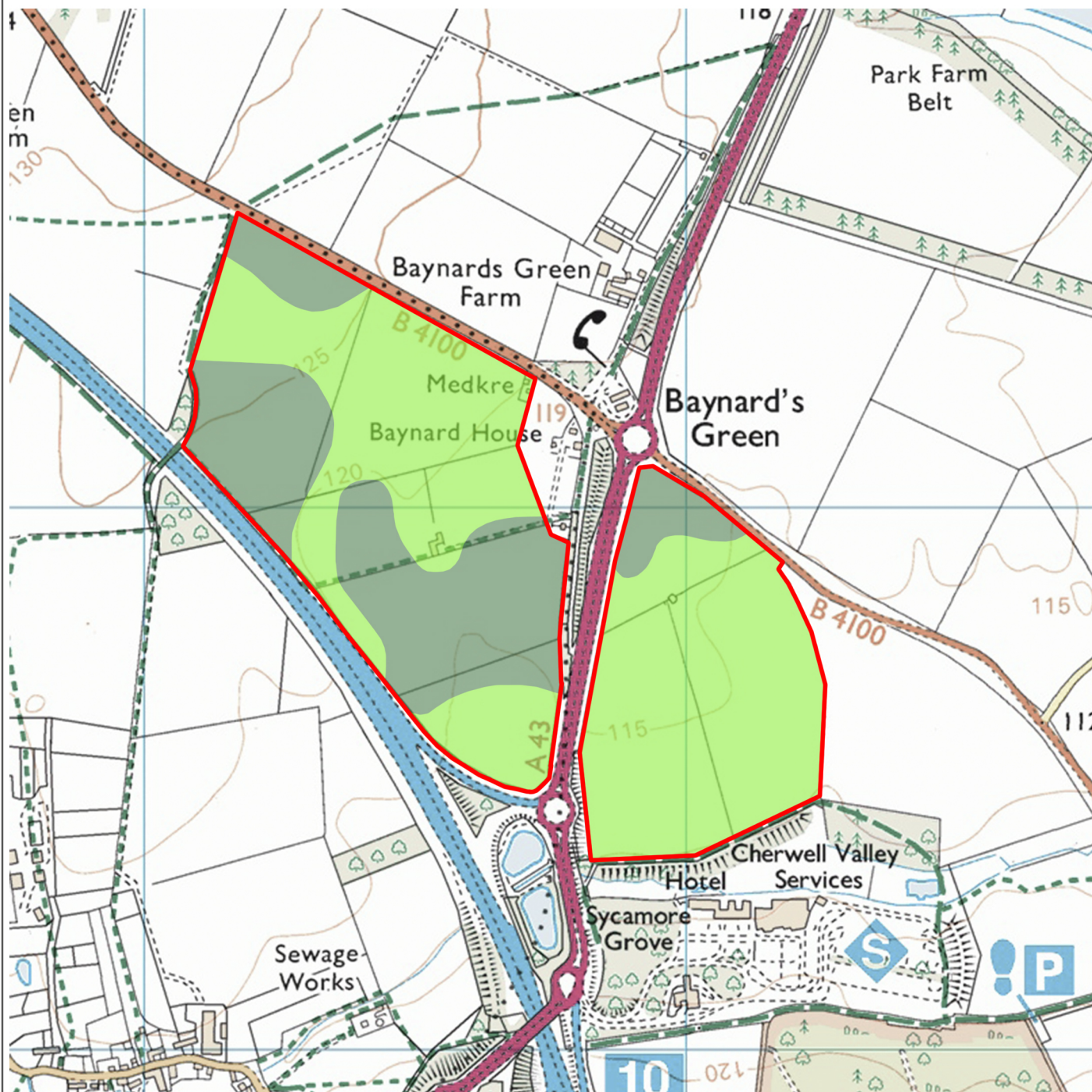
J10, M40

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ALC Grade

- Grade 1
- Grade 2
- Subgrade 3a
- Subgrade 3b
- Grade 4
- Grade 5
- Non-agricultural

Site boundary



Client

Albion Land

Project No C792
 Dwg. No 2
 Scale NTS
 Date 24/08/2021
 Drawn By ELA

Figure 2:

Agricultural Land Classification

Project Name

J10, M40

R W Askew BSc(Hons) MSc CSCi
 The Old Stables, Upexe, Exeter, EX5 5ND
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Appendix 1: Soil Profile Logs

Project Number	Project Name	Parcel
C792	J10 M40	

Date of Survey	Survey Type	Surveyor(s)	Company
26/05/2021	ALC	RDM	Askew Land and Soil

Weather	Relief	Land use and vegetation
Dry, Sunny	Level	

Grid Reference	Postcode	Altitude	Area
SP546288	OX277SS	117	66

MAFF prov	MAFF detailed	Flooding
Grade 3	None	Flood Zone 1

AAR	ATO	MDw	MDp	FCD	Climate grade
687	1369	98	88	149	1

Bedrock	Superficial deposits
White Limestone Formation	None/Head

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

Revision Number	Date Revised
2	24/08/2021

Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix Munsell colour	Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn C	SPL	Drought			Wet		Final ALC			Profile notes							
	NGR	x	y					Top	Btm	Thick		Form	Munsell colour	Form	Munsell colour			%	>2cm	>6cm	Type	%	>2cm	>6cm	Type	Strength					Size	Shape	VSC - V4	VSC - V4	No	No	MBw	MBp		Gd	WC	Gw	Limitation 1	Limitation 2	Limitation 3	Grade
1	SP 54200 29500	454200	229500	130	s7	SE		0 30 30	30 60	30 30	7.5YR4/4 5YR4/4				No	HCL - Cla HCL - Cla	5 10	5 1	1 1	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VSC - V4 VSC - V4	No No	No No	-7 8	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 60cm									
2	SP 54200 29400	454200	229400	130	s7	SE		0 38 38	38 43	38 5	7.5YR4/4 5YR4/4				No	HCL - Cla HCL - Cla	3 10	3 2	2 2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-24 -14	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 43cm									
3	SP 54300 29400	454300	229400	127	s7	SE		0 30 30	30 50	30 20	7.5YR4/4 7.5YR4/6				No	HCL - Cla HCL - Cla	2 10	2 2	2 2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	NON - N NON - N	No No	No No	-15 -5	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 50cm									
4	SP 54400 29400	454400	229400	126	s7	SE		0 30 45	30 45 70	30 15 25	7.5YR3/4 7.5YR4/4 5YR5/2		MD - h 10YR5/6		No No Yes	HCL - Cla C - Clay C - Clay	2 10 20	2 2	2 2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	SC - Sllg SC - Sllg VC - Very calc	No No No	No No No	-2 21	3a	WC I	2	Droughtiness				3a	Limestone at 70cm ; assume no spl but gleyed <70cm									
5	SP 54200 29300	454200	229300	128	s7	SE		0	33	33	7.5YR4/4				No	HCL - Cla	5	5	13	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	-41	-31	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm								
6	SP 54300 29300	454300	229300	126	s7	SE		0 30	30 33	30 3	7.5YR4/4 7.5YR4/4				No	C - Clay C - Clay	5 30	5 1	1	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-45 -35	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm ; topsoil c/hcl cac03 upgrade applies calc C									
7	SP 54400 29300	454400	229300	125	s7	SE		0	33	33	7.5YR4/4				No	HCL - Cla	6	6	5	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ve	No	No	-41	-31	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm								
8	SP 54500 29300	454500	229300	123	s7	SE		0 30 40	30 40 50	30 10 10	7.5YR3/4 7.5YR3/4				No	HCL - Cla HCL - Cla HCL - Cla	5 20 30	5 2	2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	SC - Sllg SC - Sllg	No No	No No	-20 -10	3b	WC I	2	Droughtiness				3b	augered/dug to 40cm to impenetrable limestone									
9	SP 54600 29300	454600	229300	123	s7	SE		0 30	30 32	30 2	7.5YR4/4 7.5YR4/4				No	HCL - Cla HCL - Cla	10 30	10 6	6	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	MC - M MC - M	No No	No No	-46 -36	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 32cm									
10	SP 54200 29200	454200	229200	128	s7	SE		0 35	35 60	35 25	7.5YR4/4 5YR4/4				No	HCL - Cla C - Clay	5 10	5 2	2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	SC - Sllg VC - Ve	No No	No No	-8 10	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 60cm									
11	SP 54300 29200	454300	229200	126	s7	SE		0 33 45	33 45 50	33 12 5	7.5YR4/4 7.5YR4/4 5YR4/4		CD - G 10YR5/6		No No No	C - Clay C - Clay C - Clay	2 10 20	2 2	2	SLST - Soft oolitic or dolomitic limestones SLST - soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	SC - Sllg SC - Sllg SC - Sllg	No No No	No No No	-18 -8	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 50cm									
12	SP 54400 29200	454400	229200	125	s7	SE		0	30	30	7.5YR4/4					HCL - Cla	6	6	4	SLST - Soft oolitic or dolomitic limestones				Not Applic		No	No	-47	-37	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 30cm								
13	SP 54500 29200	454500	229200	123	s7	SE		0 30	30 48	30 18	7.5YR4/4 7.5YR4/6				No	HCL - Cla HCL - Cla	3 10	3 2	2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	NON - N NON - N	No No	No No	-19 -9	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 48cm									

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			Profile notes
	NGR	X	Y					Top	Btm	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	
14	SP 54600 29200	454600	229200	123	≤7	SE		0 30	30 40	30 10	7.5YR4/4 7.5YR4/5				No No	HCL - Cla HCL - Cla	5 10	5 1		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-31 -21	3b	WC I 2			Droughtiness			3b	Impenetrable limestone at 40cm		
15	SP 54100 29100	454100	229100	123	≤7	SE		0 30 40	30 40 10	30 10	5YR4/3 5YR4/3 5YR4/3				No No No	C - Clay C - Clay C - Clay	6 3 3	6 4 4		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	NON - N NON - N NON - Non-ca	No No No	-37 -23	1	WC I 3a			Droughtiness			3a	No spl. Soil friable to 70cm firm 70-90cm ; bulrushes close/phone mast			
16	SP 54200 29100	454200	229100	123	≤7	SE		0 33	33 43	33 10	7.5YR4/4				No No	HCL - Cla HCL - Cla	6 30	6 4		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	MC - M VC - Ve	No No	No No	-29 -19	3b	WC I 2			Droughtiness			3b	Impenetrable limestone at 43cm		
17	SP 54300 29100	454300	229100	122	≤7	SE		0 35	35 50	35 15	7.5YR4/4 7.5YR5/6				No No	HCL - Cla C - Clay	5 10	5 3		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	MC - M VC - Ve	No No	No No	-15 -5	3a	WC I 2			Droughtiness			3a	Impenetrable limestone at 50cm		
18	SP 54400 29100	454400	229100	120	≤7	SE		0 35	35 40	35 5	7.5YR4/4 7.5YR4/4				No No	HCL - Cla C - Clay	8 15	8 3		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-32 -22	3b	WC I 2			Droughtiness			3b	Impenetrable limestone at 40cm		
19	SP 54500 29100	454500	229100	122	≤7	SE		0 30 32	30 32 2	30 10	7.5YR4/4 7.5YR4/4 7.5YR4/4				No No No	HCL - Cla HCL - Cla HCL - Cla	10 30 30	10 6		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	MC - M MC - M MC - M	No No No	No No No	-33 -23	3b	WC I 2			Droughtiness			3b	Impenetrable limestone at 42cm		
20	SP 54600 29100	454600	229100	122	≤7	SE		0 35	35 60	35 25	7.5YR4/4 7.5YR5/4				No No	HCL - Cla C - Clay	3 10	3 2		SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	NON - N NON - N	No No	No No	-7 11	3a	WC I 2			Droughtiness			3a	Impenetrable limestone at 60cm		
END																																							

Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix Munsell colour	Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn C	SPL	Drought			Wet		Final ALC			Profile notes							
	NGR	x	y					Top	Btm	Thick		Form	Munsell colour	Form	Munsell colour			%	>2cm	>6cm	Type	%	>2cm	>6cm	Type	Strength					Size	Shape	Not Applic	VC - Ver	No	No	MBw	MBp		Gd	WC	Gw	Limitation 1	Limitation 2	Limitation 3	Grade
21	SP 54200 29000	454200	229000	123	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	6	6	3	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ver	No	No	No	-43	-33	3b	WC I	2	Droughtiness				3b	Close to m40 road stone and tarmac lumps at edge of crop							
22	SP 54300 29000	454300	229000	122	≤7	S		0	30	30	7.5YR4/4				No	MCL - Cla	8	8	4	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ver	No	No	No	-44	-34	3b	WC I	1	Droughtiness				3b	Impenetrable limestone at 33cm							
23	SP 54400 29000	454400	229000	120	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	5	5	3	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	No	-2	23	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 70cm							
24	SP 54500 29000	454500	229000	122	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	5	5	3	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ver	No	No	No	-42	-32	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm							
25	SP 54600 29000	454600	229000	122	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	6	6	4	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ver	No	No	No	-43	-33	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm							
26	SP 54700 29000	454700	229000	121	≤7	S		0	30	30	7.5YR4/6				No	HCL - Cla	6	6	4	SLST - Soft oolitic or dolomitic limestones				Not Applic	VC - Ver	No	No	No	-42	-32	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm							
27	SP 54300 28900	454300	228900	122	≤7	S		0	30	30	7.5YR4/6				No	HCL - Cla	6	6	4	SLST - Soft oolitic or dolomitic limestones				Not Applic	SC - Sli	No	No	No	-32	-22	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 40cm							
28	SP 54400 28900	454400	228900	119	≤7	S		0	30	30	7.5YR3/4				No	MCL - Cla	2	2	1	SLST - Soft oolitic or dolomitic limestones				Not Applic	SC - Sli	No	No	No	0	23	3a	WC I	1	Droughtiness				3a	Impenetrable limestone at 70cm							
29	SP 54500 28900	454500	228900	116	≤7	S		0	30	30	7.5YR3/4				No	HCL - Cla	3	3	2	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	No	-45	-35	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 30cm							
30	SP 54600 28900	454600	228900	116	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	5	5	3	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	No	-17	-5	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 55cm							
31	SP 54700 28900	454700	228900	117	≤7	S		0	30	30	7.5YR4/4				No	HCL - Cla	5	5	3	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	No	-17	-5	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 55cm							
32	SP 54400 28800	454400	228800	119	≤7	S		0	33	33	7.5YR4/4				No	HCL - Cla	3	3	1	SLST - Soft oolitic or dolomitic limestones				Not Applic	MC - M	No	No	No	-23	-13	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 45cm							
33	SP 54500 28800	454500	228800	119	≤7	S		0	30	30	5YR4/4				No	HCL - Cla	2	2		SLST - Soft oolitic or dolomitic limestones				Not Applic	NON - N	No	No	No	21	21	2	WC I	2	Droughtiness Wetness				2	Topsoil m/hcl note geology = head-clay silt gravel							

Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix Munsell colour	Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn C	SPL	Drought			Wet		Final ALC			Profile notes									
	NGR	X	Y					Top	Bttm	Thick		Form	Munsell colour	Form	Munsell colour			%	> 2cm	> 6cm	Type	%	> 2cm	> 6cm	Type	Strength					Size	Shape	No	VC	- Ve	No	No	-6		10	3a	WC	I	2	Limitation 1	Limitation 2	Limitation 3	Grade
34	SP 54600 28800	454600	228800	116	≤7	S		0 35	35 60	35 25	7.5YR4/4 7.5YR4/6				No No	HCL - Cla HCL - Cla	5 10	5 1	1 1	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-6 10	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 60cm											
35	SP 54700 28800	454700	228800	117	≤7	S		0 35	35 90	35 55	7.5YR4/4 7.5YR5/4				No No	HCL - Cla C - Clay	3 10	3 1	1 1	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-16 25	2	WC I	2	Droughtiness Wetness				2	Difficult to auger 90cm clay friable with LMST fragments											
36	SP 54500 28700	454500	228700	118	≤7	S		0 30 32 32	30 2 23	30 7.5YR4/4 7.5YR4/4				No No No	MCL - Cla MCL - Cla MCL - Cla	5 12 30	5 3	3 3	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	VC - Ve VC - Ve VC - Ve	No No No	No No No	-17 -5	3a	WC I	1	Droughtiness				3a	Impenetrable limestone at 55cm												
37	SP 54600 28700	454600	228700	116	≤7	S		0 33 35	33 2 20	33 7.5YR4/4 7.5YR4/6				No No No	HCL - Cla C - Clay C - Clay	5 10 30	5 2	2 2	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	VC - Ve VC - Ve VC - Ve	No No No	No No No	-16 -3	3a	WC I	2	Droughtiness				3a	Impenetrable limestone to 55cm												
38	SP 54700 28700	454700	228700	114	≤7	S		0 30 33	30 3 22	30 7.5YR4/4 7.5YR5/4				No No No	HCL - Cla HCL - Cla HCL - Cla	6 10 30	6 3	3 3	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	VC - Ve VC - Ve VC - Ve	No No No	No No No	-17 -5	3a	WC I	2	Droughtiness				3a	Impenetrable limestone at 55cm												
39	SP 54600 28600	454600	228600	116	≤7	S		0 30	30 40	30 10	7.5YR4/4 7.5YR4/6				No No	MCL - Cla MCL - Cla	8 30	8 4	4 4	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-35 -25	3b	WC I	1	Droughtiness				3b	Impenetrable limestone 30cm-40cm											
40	SP 54700 28600	454700	228600	114	≤7	S		0 33	33 35	33 2	7.5YR3/4 7.5YR4/4				No No	HCL - Cla C - Clay	10 10	10 5	5 5	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve MC - M	No No	No No	-40 -30	3b	WC I	2	Droughtiness				3b	Impenetrable limestone at 33cm											
41	SP 54700 28500	454700	228500	114	≤7	S		0 40	40 50	40 10	7.5YR3/4 7.5YR4/4				No	MCL - Cla C - Clay	5 10	5 3	3 3	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ve VC - Ve	No No	No No	-14 -4	3a	WC I	1	Droughtiness				3a	Impenetrable limestone to 50cm											
END																																																

Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix Munsell colour	Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn C	SPL	Drought			Wet		Final ALC			Profile notes			
	NGR	X	Y					Top	Btm	Thick		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
55	SP 54900 28600	454900	228600	115	≤7	S		0 30	30 33	30 3	7.5YR4/4 10YR4/4				No	HCL - Cla HCL - Cla	8 30	8 30	6 30	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	MC - M VC - Very calc	No No	No No	-44 -34	3b	WC I 2			Droughtiness			3b	Impenetrable limestone to 33cm					
56	SP 55000 28600	455000	228600	115	≤7	S		0 35 45	35 45 50	35 7.5YR4/3 7.5YR4/6 7.5YR4/6				No	HCL - Cla HCL - Cla HCL - Cla	5 10 10	5 10 10	3 3 5	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	NON - N VC - Very calc VC - Very calc	No No No	No No No	-15 -5 -5	3a	WC I 2			Droughtiness			3a	Impenetrable limestone to 50cm						
57	SP 55100 28600	455100	228600	114	≤7	S		0	30	30	10YR3/4			No	HCL - Cla	8	8	4	SLST - Soft oolitic or dolomitic limestones				Not Applic	SC - Sli	No	No	-47	-37	3b	WC I	2			Droughtiness			3b	Impenetrable limestone to 30cm				
58	SP 55200 28600	455200	228600	114	≤7	S		0 30	30 35	30 5	7.5YR3/4 7.5YR3/4			No	HCL - Cla HCL - Cla	5 20	5 20	2 20	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	SC - Sli VC - Ver	No No	No No	-39	-29	3b	2			Droughtiness			3b	Impenetrable limestone to 35cm					
59	SP 54900 28500	454900	228500	115	≤7	S		0 30 40	30 40 10	30 10YR4/4 10YR4/4				No	HCL - Cla HCL - Cla HCL - Cla	8 30 30	8 30 30	6 30 30	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate Moderate	MC - M VC - Ver VC - Ver	No No No	No No No	-31	-21	3b	WC I	2			Droughtiness			3b	Impenetrable limestone at 43cm				
60	SP 55000 28500	455000	228500	115	≤7	S		0 30	30 35	30 5	10YR3/3 10YR3/4			No	HCL - Cla C - Clay	8 30	8 30	4 30	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ver VC - Ver	No No	No No	-41	-31	3b	WC I	2			Droughtiness			3b	Impenetrable limestone at 35cm				
61	SP 55100 28500	455100	228500	114	≤7	S		0 30	30 40	30 10	7.5YR3/4 7.5YR3/2			No	HCL - Cla C - Clay	5 10	5 10	1 10	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ver VC - Ver	No No	No No	-31	-21	3b	WC I	2			Droughtiness			3b	Impenetrable limestone at 40cm				
62	SP 55200 28500	455200	228500	114	≤7	S		0 30	30 45	30 15	7.5YR4/4 5YR4/4			No	HCL - Cla C - Clay	3 10	3 10	1 10	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ver VC - Ver	No No	No No	-23	-13	3b	WC I	2			Droughtiness			3b	Impenetrable limestone to 45cm				
63	SP 54900 28400	454900	228400	110	≤7	S		0 30	30 33	30 3	7.5YR3/4 7.5YR3/4			No	HCL - Cla HCL - Cla	10 10	10 10	5 10	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ver VC - Ver	No No	No No	-44	-34	3b	WC I	2			Droughtiness			3b	Impenetrable limestone to 33cm				
64	SP 55000 28400	455000	228400	112	≤7	S		0 30	30 35	30 5	10YR3/3 10YR3/4			No	HCL - Cla HCL - Cla	15 20	15 20	10 10	SLST - Soft oolitic or dolomitic limestones SLST - Soft oolitic or dolomitic limestones				Not Applic Moderate	VC - Ver VC - Ver	No No	No No	-44	-34	3b	WC I	2			Droughtiness			3b	Impenetrable limestone to 35cm				
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% CaCO₃)
 VSC - Very slightly calcareous (0.5 - 1% CaCO₃)
 SC - Slightly calcareous (1 - 5% CaCO₃)
 MC - Moderately calcareous (5 - 10% CaCO₃)
 VC - Very calcareous (>10% CaCO₃)

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 2: Soil Pit Description

Project	Location	Date	Surveyor(s)	Company
C792	Junction 10, M40	26-May-21	RDM	Askew Land and Soil

Pit	WC	Grade	Limitation(s)	Notes
1	l	3b	Droughtiness	Limestone layer at 35cm; difficult to auger /dig below this depth

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	54374	29200	125	AB12	2°	SW	Straight	Level	Cultivated	Cereals		Mild	Cloudy	Slight	Dry

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	30	hcl	Brown	7.5YR4/4	n						10	10	LMST soft			y	n	wk	f	sab	friable	clear	wavy	>0.5mm	n
2	30	35	hcl	Brown	7.5YR4/4	n						30	30	LMST soft			y	n	wk	m	sab	friable	n/a	n/a	>0.5mm	n

Pit	WC	Grade	Limitation(s)	Notes
2	l	3b	3b Droughtiness	Limestone layer at 35cm; difficult to auger /dig below this depth

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	551	228	115	AB60	2°	SW	Straight	Level	Cultivated	Cereals		Mild	Cloudy	Slight	Dry

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	27	hcl	dark brown	7.5YR3/4	n						5	5	LMST soft			y	n	wk	f	sab	friable	clear	wavy	>0.5mm	n
2	27	30	c	dark yellow brown	10YR4/4	n						5	5	LMST soft			y	n	wk	m	sab	friable	clear	wavy	>0.5mm	n
3	30	35	c	yellowish brown	10YR5/4	n						30	30	LMST soft			y	n	wk	m	sab	friable	n/a	n/a	>0.5mm	n


Appendix 3: Topsoil Texture Analysis



TEST REPORT
ISSUED BY SOIL PROPERTY TESTING LTD
DATE ISSUED: 23/06/2021



0998

Contract	J10 M40
Serial No.	38885_1
Client: Askew Land and Soil Ltd The Old Stables Upexe Exeter EX5 5ND	<i>Soil Property Testing Ltd</i> 15, 16, 18 Halcyon Court, St Margaret's Way, Stukeley Meadows, Huntingdon, Cambridgeshire, PE29 6DG Tel: 01480 455579 Email: enquiries@soilpropertytesting.com Website: www.soilpropertytesting.com
Samples Submitted By: Askew Land and Soil Ltd Samples Labelled: J10 M40	Approved Signatories: <input checked="" type="checkbox"/> J.C. Garner B.Eng (Hons) FGS Technical Director & Quality Manager <input type="checkbox"/> W. Johnstone Materials Lab Manager <input type="checkbox"/> D. Sabnis Operations Manager 
Date Received: 09/06/2021	Samples Tested Between: 09/06/2021 and 23/06/2021
Remarks: For the attention of Robert Askew	
Notes:	<ol style="list-style-type: none">1 All remaining samples or remnants from this contract will be disposed of after 21 days from today, unless we are notified to the contrary.2 Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.3 Tests marked "NOT UKAS ACCREDITED" in this test report are not included in the UKAS Accreditation Schedule for this testing laboratory.4 This test report may not be reproduced other than in full except with the prior written approval of the issuing laboratory.5 The results within this report only relate to the items tested or sampled.



TEST REPORT

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0998

Contract		J10 M40																	
Serial No.		38885_1					Target Date		23/06/2021										
Scheduled By		Askew Land and Soil Ltd																	
Schedule Remarks																			
Bore Hole No.	Type	Sample Ref.	Top Depth	Particle Size Distribution (BS1377)										Sample Remarks					
				1	2	3	4	5	6	7	8	9	10						
-	D	34	0.00	1															
-	D	50	0.00	1															
Totals				2															End of Schedule



TEST REPORT

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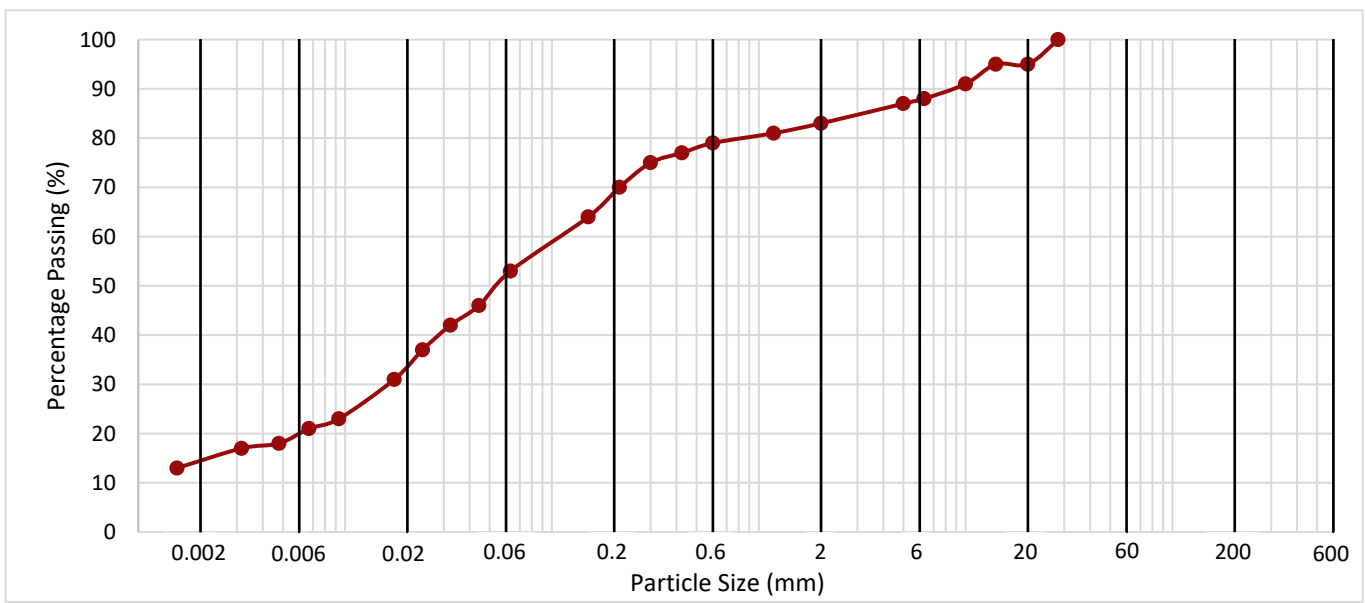
0998

Contract	J10 M40
Serial No.	38885_1

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
-	0.00 - 0.25	D	34	Brown slightly gravelly slightly sandy silty CLAY with occasional recently active roots. Gravel is brown, white and black angular to rounded chert	

Method of Test: **Wet Sieve + Hydrometer** Method of Pretreatment: **Not required**



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0444	46	39
	0.0323	42	
	0.0237	37	
	0.0173	31	Clay by Dry Mass (%)
	0.0093	23	
	0.0067	21	
	0.0048	18	
	0.0032	17	
0.0015	13	14	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	83	30
1.18	81	
0.600	79	
0.425	77	
0.300	75	
0.212	70	
0.150	64	
0.063	53	

Fines By Dry Mass (%)	
<0.063mm	53

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		17
125		
90		
63		
50		
37.5		
28	100	
20	95	
14	95	
10	91	
6.3	88	
5	87	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
 Method of test: BS1377: Part 2: 1990: 9.2,9.5
 Type of Sample Key: U=Undisturbed, B=Bulk, D=Disturbed, J=Jar, W=Water, SPT=Split Spoon Sample, C=Core Cutter
 Comments:



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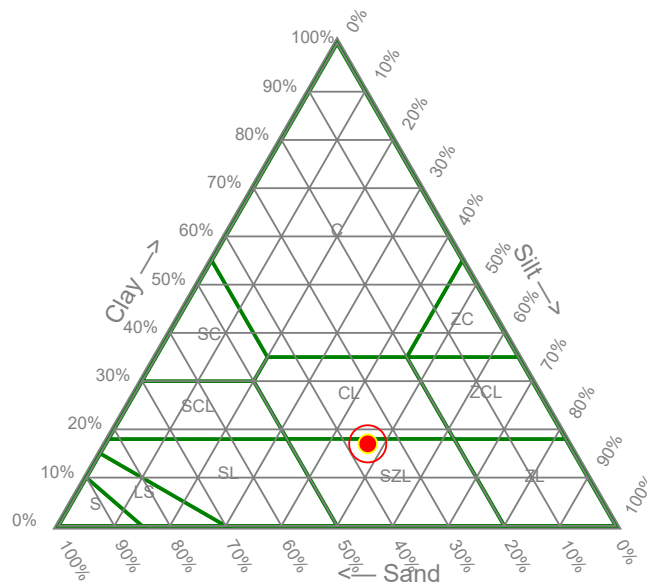
Soil Texture Triangle

Particle size class estimator

Here is a tool that allows you to estimate the particle size class of a soil sample from the proportions of sand, silt and clay. The estimator is based on the texture class intervals of the Soil Survey of England and Wales - note that other international standards also exist, such as the USDA and FAO triangles.

Enter soil sample proportions:

Clay (%)	X	Sand (%)	X	Silt (%)	X	Calculate
	17		36		47	Calculate



Top

AB34 Soil sample is a Sandy Silt Loam

INFOBAR

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Our free online simplified interactive soil map for England and Wales.

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An Online Guide to the Soils of England and Wales.

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Answers to frequently asked questions.

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- » Radio 4 Interview on Farming Today: January 17 2017

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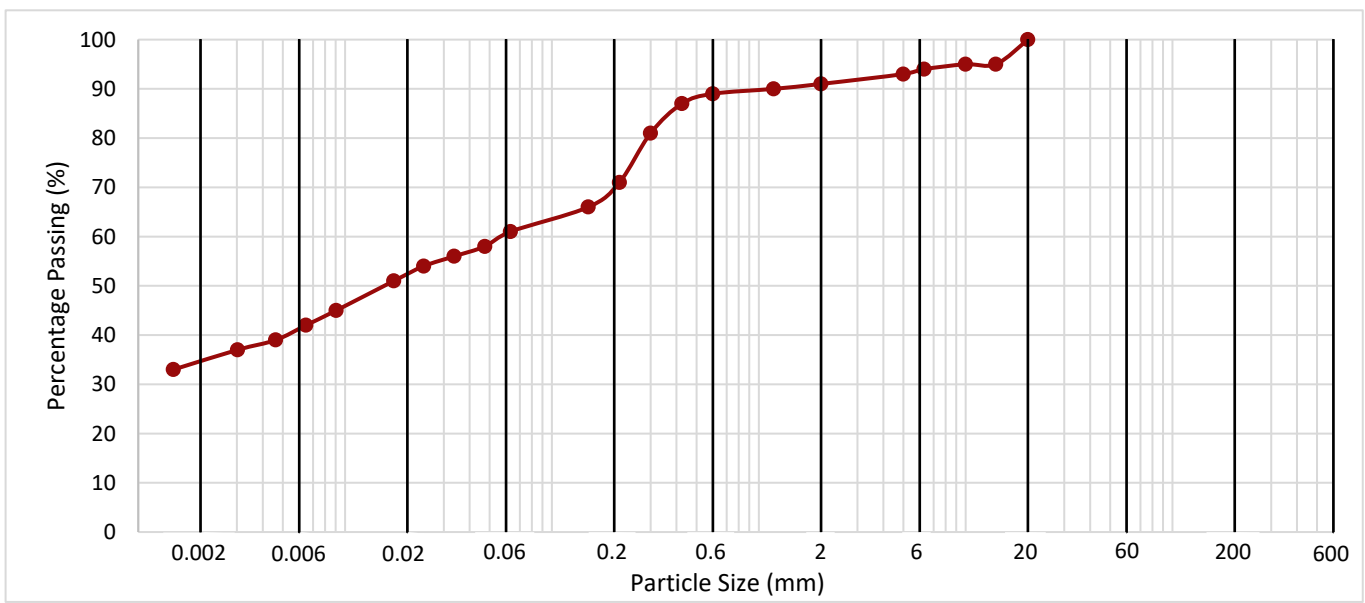
0998

Contract	J10 M40
Serial No.	38885_1

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Pit No.	Depth (m)	Sample		Description	Remarks
		Type	Reference		
-	0.00 - 0.25	D	50	Brown slightly gravelly slightly sandy silty CLAY with occasional recently active roots. Gravel is brown, white angular and subangular chalk and rare chert	

Method of Test: **Wet Sieve + Hydrometer** Method of Pretreatment: **Not required**



CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	COBBLES	BOULDERS
	SILT			SAND			GRAVEL				

Hydrometer	Particle Size (mm)	Passing (%)	Silt by Dry Mass (%)
	0.0474	58	27
	0.0337	56	
	0.0240	54	
	0.0172	51	Clay by Dry Mass (%)
	0.0091	45	
	0.0065	42	
	0.0046	39	
	0.0030	37	
0.0015	33	34	

Sieve Size (mm)	Passing (%)	Sand By Dry Mass (%)
2.00	91	30
1.18	90	
0.600	89	
0.425	87	
0.300	81	
0.212	71	
0.150	66	
0.063	61	

Fines By Dry Mass (%)	
<0.063mm	61

Sieve Size (mm)	Passing (%)	2mm+ By Dry Mass (%)
300		9
125		
90		
63		
50		
37.5		
28		
20	100	
14	95	
10	95	
6.3	94	
5	93	

Method of Preparation: BS1377: Part 1: 2016: 8.3 & 8.4.5
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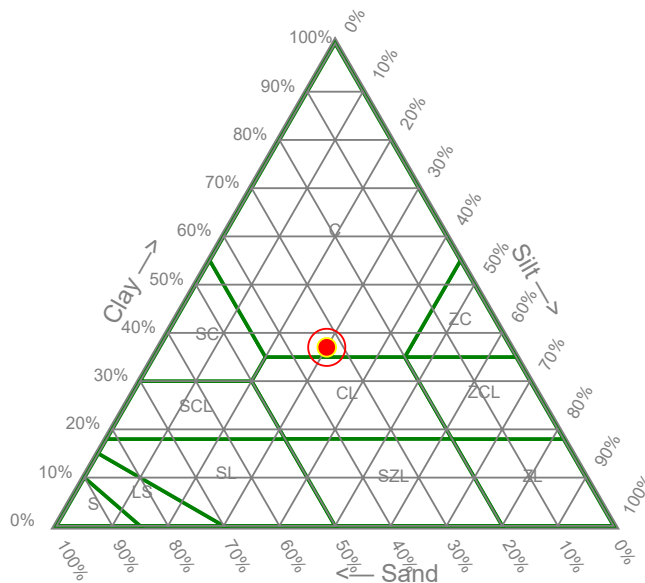
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Enter soil sample proportions:

Clay (%)	X	Sand (%)	X	Silt (%)	X	Calculate
	37		33		30	Calculate



Top

AB50 Soil sample is a Clay

INFOBAR

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Download full site-specific soil reports for your neighbourhood, development site, farm, wildlife sanctuary, etc.

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