July 2025

Gleeson Land Limited

Agricultural Land Classification and Soil Resources

at

Land at Newlands Farm, Arborfield

Beechwood Court,
Long Toll, Woodcote,
RG8 0RR

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Contents

1. Introduction

1.1. Reading Agricultural Consultants Limited (RAC) is instructed by Gleeson Land Limited to investigate the Agricultural Land Classification (ALC) and soil resources of land at Newlands Farm, Arborfield by means of a detailed survey of site and soil characteristics.

1.2. Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for grading the quality of agricultural land[1], and summarised in Natural England's Technical Information Note (TIN) 049[2].

1.3. Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. The principal physical factors influencing grading are climate, site conditions and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.

1.4. Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use. Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. Grade 3 land has moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield, and is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grade 4 land is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. Grade 5 is very poor quality land, with severe limitations which restrict use to permanent pasture or rough grazing.

1.5. Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile (BMV) agricultural land.

1.6. As explained in Natural England's TIN049, the whole of England and Wales was mapped from reconnaissance field surveys in the late 1960s and early 1970s, to provide general strategic guidance on agricultural land quality for planners. This Provisional Series of maps was published

[1] **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land*.

[2] **Natural England (2012).** *Technical Information Note 049 - Agricultural Land Classification: protecting the best and most versatile agricultural land*, Second Edition.

on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360). The Provisional ALC map shows the site as undifferentiated Grade 3. However, TIN049 explains that:

> *"These maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance. They show only five grades: their preparation preceded the subdivision of Grade 3 and the refinement of criteria, which occurred after 1976. They have not been updated and are out of print. A 1:250 000 scale map series based on the same information is available. These are more appropriate for the strategic use originally intended …"*

1.7. TIN049 goes on to explain that a definitive ALC grading should be obtained by undertaking a detailed survey according to the published guidelines, at an observation density of one boring per hectare. This survey follows the detailed methodology set out in the ALC guidelines.

2. Site and climatic conditions

General features, landform and drainage

2.1. The site comprises approximately 24.5 hectares of land across two parcels in mixed grass and arable use.

2.2. The main parcel extends to 22.5ha and is located to the north-east of Arborfield. Mole Road and Church Lane border the parcel to the south, and Arborfield Church Road forms the western boundary. Other agricultural land lies to the north and east. Non-agricultural land within the site comprises woodland in the north-east.

2.3. The smaller parcel comprises 2ha of land to the east of the main parcel. Barkham Brook borders this area to the west, and Mole Road borders it to the east. Other agricultural land, which is part of the same field, borders the parcel to the north.

2.4. Topography across the main parcel slopes gently from around 59m above Ordnance Datum (AOD) in the south-west to around 45m in the north-east. Land in the smaller parcel slopes from Mole Road at 47-49m AOD down to 45m AOD in the west, along Barkham Brook.

2.5. Land in the main parcel drains downslope and via peripheral field ditches. Land in the smaller parcel drains into the Barkham Brook.

Agro-climatic conditions

2.6. Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point dataset at a representative altitude of 51m AOD. The data are given in Table 1. The site has a warm climate with moderate rainfall. Crop moisture deficits are moderately large to large. The number of Field Capacity Days (FCD) is smaller than the average for lowland England (150) and is favourable for providing opportunities for agricultural field work.

Table 1: Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	662mm
Accumulated Temperatures >0°C	1,466day°
Field Capacity Days	137 days
Average Moisture Deficit, wheat	115mm
Average Moisture Deficit, potatoes	109mm

Soil parent material and soil type

2.7. The bedrock geology mapped by the British Geological Survey[3] across the site is the London Clay Formation. This formation mainly comprises blue-grey or grey-brown, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay.

2.8. There are no superficial deposits mapped across the main parcel. A thin unit of Alluvium is mapped along the Barkham Brook in the smaller, eastern parcel.

2.9. The Soil Survey of England and Wales soil association mapping[4] (1:250,000 scale) shows the Wickham 4 association at the site, which is characterised by slowly permeable, fine silty over clayey, fine loamy over clayey and clayey soils. Profiles are typically poorly drained in Wetness Class (WC) IV[5], with improvement to WC III possible where adequately drained.

[3] **British Geological Survey (2025).** *Geology of Britain viewer*, http://mapapps.bgs.ac.uk/geologyofbritain/home.html

[4] **Soil Survey of England and Wales (1984).** *Soils of South East England* (1:250,000), Sheet 6.

[5] **Jarvis et al (1984).** *Soils and Their Use in South East England*. Soil Survey of England and Wales Bulletin 15, Harpenden.

3. Agricultural land quality

Soil survey methods

3.1. Twenty-six soil profiles were examined across the site using an Edelman (Dutch) auger at an observation density of one per hectare, in accordance with the established recommendations for ALC surveys[2]. One observation pit was also excavated to examine subsoil structures. The locations of observations are shown on Figure RAC/10757/1. At each observation point, the following characteristics were assessed for each soil horizon up to a maximum of 120cm or any impenetrable layer:

- soil texture;
- stone content;
- colour (including localised mottling);
- consistency;
- structural condition;
- free carbonate; and
- depth.

3.2. Two topsoil samples were submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are presented in Appendix 1.

3.3. Soil WC was determined from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15cm thick, in relation to the number of Field Capacity Days at the location.

3.4. Soil droughtiness was investigated by the calculation of moisture balance equations (given in Appendix 2). Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.

Agricultural land classification and site limitations

3.5. Assessment of land quality has been carried out according to the revised ALC guidelines[1]. Soil profiles have been described according to Hodgson[6] which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.

3.6. Agricultural land quality at the site is limited by soil wetness to either Subgrade 3a or 3b, depending on the severity of the limitation. There are two soil types present.

3.7. The topsoil across the site is relatively consistent and comprises dark greyish brown (10YR4/2 in the Munsell soil colour charts[7]) medium clay loam. The stone content is very slight to slight, ranging from 2% to 10% by volume. The topsoil is friable and has a weak, medium subangular blocky structure within the arable land.

3.8. Within the first soil type, the upper subsoil is permeable and comprises brown (10YR5/3) or greyish brown (10YR5/2) medium or heavy clay loam. The stone content is stoneless to slight, with volumes up to 15%, although most observations contain 0-7%. The upper subsoil is friable and has a coarse subangular blocky structure. Ochreous mottling is observed within this horizon, with some recordings of ferri-manganiferous nodules, indicating prolonged periods of wetness.

3.9. The lower subsoil is predominantly composed of brown (10YR5/3) or greyish-brown (10YR5/2) clay. This horizon is mostly stoneless, with a small portion recording levels of 5-15% stone. Soil structure is predominantly coarse, angular blocky and very firm. Ochreous mottling continues to depth.

3.10. Soils with these characteristics are classified as WC III and are restricted to Subgrade 3a by soil wetness. Soil wetness restricts suitable conditions for machinery throughout the year and increases the likelihood and occurrence of waterlogging within the soil profile, which limits crop growth and development.

3.11. The second soil type includes profiles where there is no permeable upper subsoil and the topsoil directly overlays the coarse, angular blocky, slowly permeable clay. These observations are classified as WC IV and are further restricted to Subgrade 3b by soil wetness.

3.12. The ALC distribution at the site is shown in Figure RAC/10757/2. The areas of each grade are given in Table 2.

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[6] **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook.* Soil Survey Technical Monograph No. 5, Silsoe.

[7] **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

Table 2: ALC areas

Grade	Description	Area (ha)	%
Subgrade 3a	Good quality	13.1	55
Subgrade 3b	Moderate quality	10.7	45
	Total	23.8	100
	Non-agricultural	0.7	-

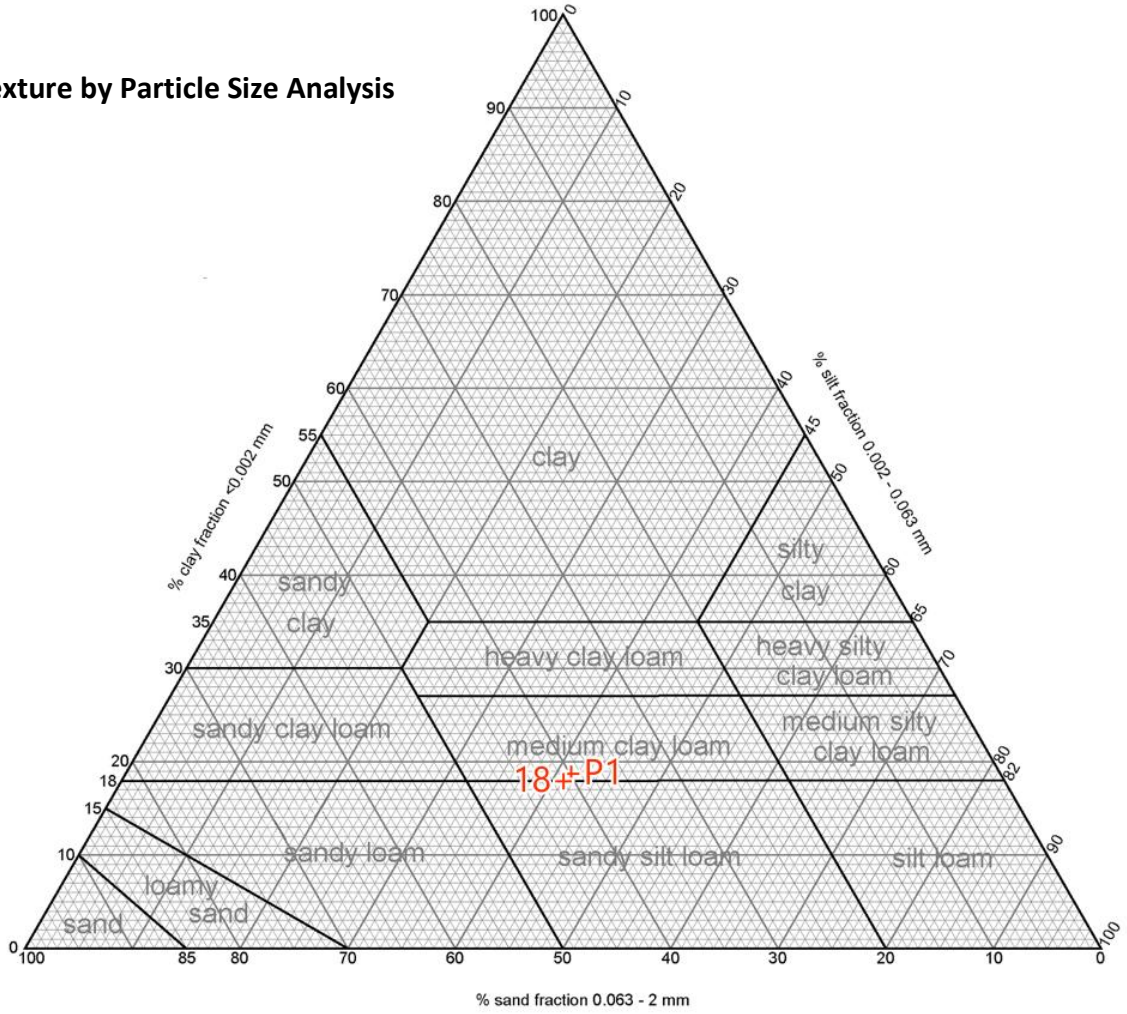
Appendix 1: Laboratory Data

Determinand	Pit 1 Topsoil	18 Topsoil	Units
Sand 2.00-0.063 mm	41	41	% w/w
Silt 0.063-0.002 mm	40	41	% w/w
Clay <0.002 mm	19	18	% w/w
Organic Matter	2.4	2.6	% w/w
Texture	Medium clay loam	Medium clay loam/sandy silt loam	

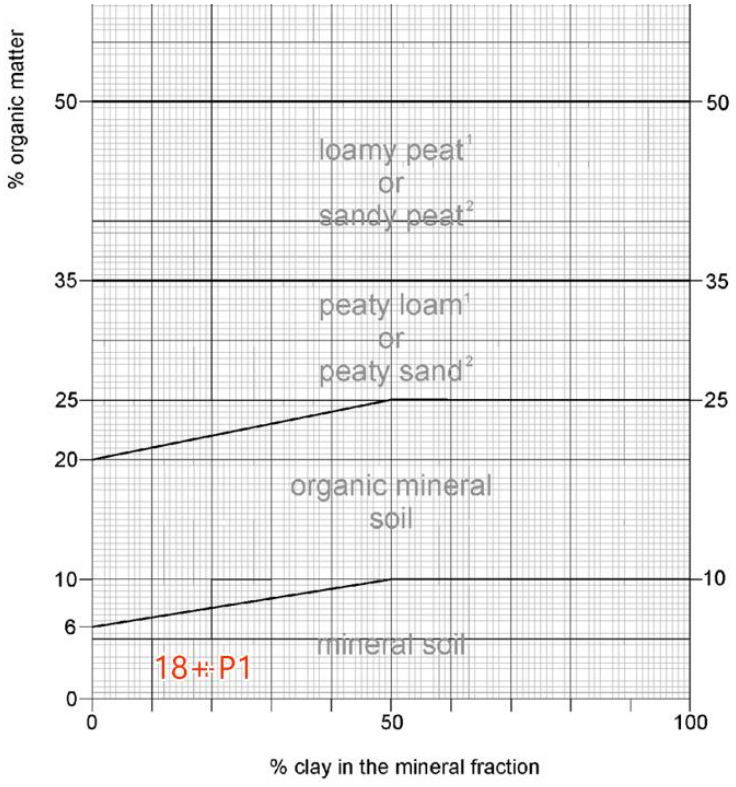
Determinand	Pit 1 Topsoil	18 Topsoil	Units
Soil pH	7.2	6.6	
Phosphorus (P)	45.3	36.1	mg/l (av)
Potassium (K)	104	94.7	mg/l (av)
Magnesium (Mg)	46.3	79.9	mg/l (av)

Determinand	Pit 1 Topsoil	18 Topsoil	Units
Phosphorus (P)	3	3	ADAS Index
Potassium (K)	1	1	ADAS Index
Magnesium (Mg)	1	2	ADAS Index

Soil Texture by Particle Size Analysis



Organic Matter Class



[1] Less than 50% sand in the mineral fraction

[2] 50% sand or more in the mineral fraction

Appendix 2: Soil Profile Summaries and Droughtiness Calculations

Wetness / workability limitations are determined according to the methodology given in Appendix 3 of the ALC guidelines, MAFF 1988

Droughtiness calculations are made according to the methodology given in Appendix 4 of the ALC guidelines, MAFF 1988.

Grades are shown for drought, wetness and any other soil or site factors which are relevant. The overall Grade is set by the most limiting factor and shown on the right.

Stone types		
%	TAv	EAv
Hard	1	0.5
N/A		

Climate Data	
MDwheat	115
MDpotato	109
FCD	137
AAR	662

Wetness Class Guidelines	*II*	*III*	*IV*	*V*	**Climate**
SPL within 80cm, gleying within 40cm	>64cm	37-64cm	<37cm		1,466
SPL within 80cm, gleying at 40-70cm	>46cm	<46cm			Limitation
No SPL but gleying within 40cm	coarse subsoil	*I*	other cases	*II*	Grade 1
Maximum depth of auger penetration is underlined					51m

Site No.		Depth cm		Texture	$CaCO_3$	Colour	Mottle colour	abund-ance	stone% Hard	stone% N/A	Struct-ure	AP wheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)
1	T	0	25	mCL	n	10YR4/2			3			44	44	n	n	*III*	3a	**3a**	WE
		25	51	mCL		10YR5/3	Fe	com	7			38	39	y	n				
		51	120	C		10YR5/2	Fe	many	0		poor	48	25	y	y				
											Total	**130**	**107**						
											MB	15	-2						
									Droughtiness grade (DR)			2	2						
2	T	0	32	mCL	n	10YR4/2			3			56	56	n	n	*III*	3a	**3a**	WE
		32	63	mCL		10YR5/3	Fe	com	3			41	48	y	n				
		63	120	hCL		10YR5/2	Fe	com	0		poor	40	8	y	y				
											Total	**136**	**113**						
											MB	21	4						
									Droughtiness grade (DR)			2	2						
3	T	0	28	mCL	n	10YR4/2			3			49	49	n	n	*IV*	3b	**3b**	WE
		28	36	mCL		10YR5/3	Fe	com	3			12	12	y	n				
		36	60	C		10YR5/2	Fe	many	0		poor	25	31	y	y				
		60	120	C		10YR5/1	Fe	many	0		poor	42	13	y	y				

										Total	**129**	**106**							
										MB	14	-3							
									Droughtiness grade (DR)		2	2							
4	T	0	28	mCL	n	10YR4/2			5		48	48	n	n	*III*	3a	**3a**	WE	
		28	42	mCL		10YR5/3	Fe	com	3		22	22	y	n					
		42	120	C		10YR5/2	Fe	many	0	poor	59	36	y	y					
										Total	**129**	**106**							
										MB	14	-3							
									Droughtiness grade (DR)		2	2							
5	T	0	27	mCL	n	10YR4/2			3		47	47	n	n	*IV*	3b	**3b**	WE	
		27	60	C		10YR5/3	Fe	many	0	poor	37	43	y	y					
		60	120	C		10YR5/2	Fe	many	0	poor	42	13	y	y					
										Total	**126**	**103**							
										MB	11	-6							
									Droughtiness grade (DR)		2	2							
6	T	0	29	mCL	n	10YR4/2			3		51	51	n	n	*IV*	3b	**3b**	WE	
		29	78	C		10YR5/3	Fe	many	0	poor	47	53	y	y					
		78	120	C		10YR5/2	Fe	many	0	poor	29	0	y	y					
										Total	**127**	**104**							
										MB	12	-5							
									Droughtiness grade (DR)		2	2							
7	T	0	27	mCL	n	10YR4/2			2		48	48	n	n	*III*	3a	**3a**	WE	
		27	42	mCL		10YR5/3	Fe	com	0		24	24	y	n					
		42	120	C		10YR5/2	Fe	many	0	poor	59	36	y	y					
										Total	**131**	**108**							
										MB	16	-1							

									Droughtiness grade (DR)		2	2							
8	T	0	28	mCL	n	10YR4/2			2		49	49	n	n	*III*	3a	**3a**	WE	
		28	60	hCL		10YR5/3	Fe	com	3		44	50	y	n					
		60	120	C		10YR5/2	Fe	many	5	poor	40	12	y	y					
										Total	**133**	**112**							
										MB	18	3							
									Droughtiness grade (DR)		2	2							
9	T	0	30	mCL	n	10YR4/2			2		53	53	n	n	*III*	3a	**3a**	WE	
		30	43	hCL		10YR5/3	Fe	com	2		20	20	y	n					
		43	120	C		10YR5/3	Fe	many	0	poor	58	35	y	y					
										Total	**131**	**108**							
										MB	16	-1							
									Droughtiness grade (DR)		2	2							
10	T	0	29	mCL	n	10YR4/2			3		51	51	n	n	*III*	3a	**3a**	WE	
		29	52	mCL		10YR5/3	Femn	com	7		33	34	y	n					
		52	120	C		10YR5/2, 10YR5/3	Fe	many	0	poor	48	23	y	y					
										Total	**132**	**109**							
										MB	17	0							
									Droughtiness grade (DR)		2	2							
11	T	0	30	mCL	n	10YR4/2			10		49	49	n	n	*III*	3a	**3a**	WE	
		30	52	mCL		10YR5/3	Femn	com	15		29	30	y	n					
		52	120	C		10YR5/2, 10YR5/3	Fe	many	0	poor	48	23	y	y					
										Total	**126**	**103**		Very dry					
										MB	11	-6							
									Droughtiness grade (DR)		2	2							

12	T	0	30	mCL	n	10YR4/2			10			49	49	n	n	*III-IV*	3b	**3b**	WE
		30	37	mCL		10YR5/3	Femn	com	15			10	10	y	n				
		37	120	C		10YR5/2, 10YR5/3	Fe	many	0	poor		66	43	y	y				
											Total	**124**	**101**						
											MB	9	-8						
										Droughtiness grade (DR)		2	2						
13	T	0	34	mCL	n	10YR4/2			5			58	58	n	n	*IV*	3b	**3b**	WE
		34	55	C		10YR5/2	Fe	many	5	poor		23	26	y	y				
		55	120	C		10YR5/2	Fe	many	7	poor		43	18	y	y				
											Total	**124**	**103**						
											MB	9	-6						
										Droughtiness grade (DR)		2	2						
14	T	0	30	mCL	n	10YR4/2			3			52	52	n	n	*IV*	3b	**3b**	WE
		30	63	C		10YR5/3	Fe	many	0	poor		35	43	y	y				
		63	120	C		10YR5/2	Fe	many	0	poor		40	9	y	y				
											Total	**127**	**104**						
											MB	12	-5						
										Droughtiness grade (DR)		2	2						
15	T	0	28	mCL	n	10YR4/2			3			49	49	n	n	*II-III*	3a	**3a**	WE
		28	46	mCL		10YR5/3			10			26	26	n	n				
		46	120	C		10YR5/3	Fe	many	15	poor		47	27	y	y				
											Total	**122**	**102**						
											MB	7	-7						
										Droughtiness grade (DR)		2	2						
16	T	0	32	mCL	n	10YR4/2			3			56	56	n	n	*IV*	3b	**3b**	WE
		32	120	C		10YR5/2	Fe	many	0	poor		72	49	y	y				

										Total	**128**	**105**							
										MB	13	-4							
									Droughtiness grade (DR)		2	2							
17	T	0	35	mCL	n	10YR4/2			3		61	61	n	n	*IV*	3b	**3b**	WE	
		35	50	C		10YR5/2	Fe	many	0	poor	20	20	y	y					
		50	120	C		10YR5/2	Fe	many	0	poor	49	26	y	y					
										Total	**130**	**107**							
										MB	15	-2							
									Droughtiness grade (DR)		2	2							
18	T	0	27	mCL	n	10YR4/2			3		47	47	n	n	*III*	3a	**3a**	WE	
		27	54	mCL		10YR5/3	Fe	com	10		37	39	y	n					
		54	120	C		10YR5/3	Fe	many	15	poor	40	18	y	y					
										Total	**124**	**104**		USS mottling faint					
										MB	9	-5							
									Droughtiness grade (DR)		2	2							
19	T	0	30	mCL	n	10YR4/2			2		53	53	n	n	*III*	3a	**3a**	WE	
		30	56	hCL		10YR5/2	Fe	com	5		36	40	y	n					
		56	80	C		10YR5/3	Fe	many	0	poor	17	18	y	y					
		80	120	C		10YR5/2	Fe	many	0	poor	28	0	y	y					
										Total	**134**	**111**							
										MB	19	2							
									Droughtiness grade (DR)		2	2							
20	T	0	31	mCL	n	10YR4/2			2		55	55	n	n	*IV*	3b	**3b**	WE	
		31	120	C		10YR5/2	Fe	v.many	0	poor	74	51	y	y					
										Total	**128**	**105**							
										MB	13	-4							

									Droughtiness grade (DR)		2	2						
21	T	0	30	mCL	n	10YR4/2			2		53	53	n	n	*IV*	3b	**3b**	WE
		30	120	C		10YR5/1	Fe	v.many	0	poor	75	52	y	y				
										Total	**128**	**105**						
										MB	13	-4						
									Droughtiness grade (DR)		2	2						
22	T	0	29	mCL	n	10YR4/2			3		51	51	n	n	*III*	3a	**3a**	WE
		29	50	mCL		10YR5/2	Femn	com	5		32	32	y	n				
		50	57	hCL		10YR5/2	Femn	many	3	m/poor	6	10	y	y				
		57	120	C		10YR5/2	Fe	many	10	poor	40	15	y	y				
										Total	**129**	**108**						
										MB	14	-1						
									Droughtiness grade (DR)		2	2						
23	T	0	30	mCL	n	10YR4/2			3		52	52	n	n	*III*	3a	**3a**	WE
		30	53	hCL		10YR5/2	Fe	com	5		33	35	y	n				
		53	120	C		10YR5/3	Fe	many	0	poor	47	22	y	y				
										Total	**133**	**110**						
										MB	18	1						
									Droughtiness grade (DR)		2	2						
24	T	0	27	mCL	n	10YR4/2			3		47	47	n	n	*III*	3a	**3a**	WE
		27	50	mCL		10YR5/2	Fe	com	3		36	36	y	n				
		50	67	hCL		10YR5/2	Femn	many	0	m/poor	14	24	y	y				
		67	120	C		10YR5/1	Fe	many	0	poor	37	4	y	y				
										Total	**135**	**111**						
										MB	20	2						
									Droughtiness grade (DR)		2	2						

25	T	0	28	mCL	n	10YR4/2			5			48	48	n	n	*III*	3a	**3a**	WE
		28	53	hCL		10YR5/3	Fe	com	0			38	40	y	n				
		53	70	C		10YR5/3	Fe	many	0		poor	12	22	y	y				
		70	120	C		10YR5/2	Fe	many	0		poor	35	0	y	y				
											Total	**133**	**110**						
											MB	18	1						
										Droughtiness grade (DR)		2	2						
26	T	0	30	mCL	n	10YR4/2			2			53	53	n	n	*III*	3a	**3a**	WE
		30	45	hCL		10YR5/3	Fe	com	0			24	24	y	n				
		45	120	C		10YR5/2	Fe	many	0		poor	56	33	y	y				
											Total	**132**	**109**						
											MB	17	0						
										Droughtiness grade (DR)		2	2						

Appendix 3: Site Photographs

Pit 1

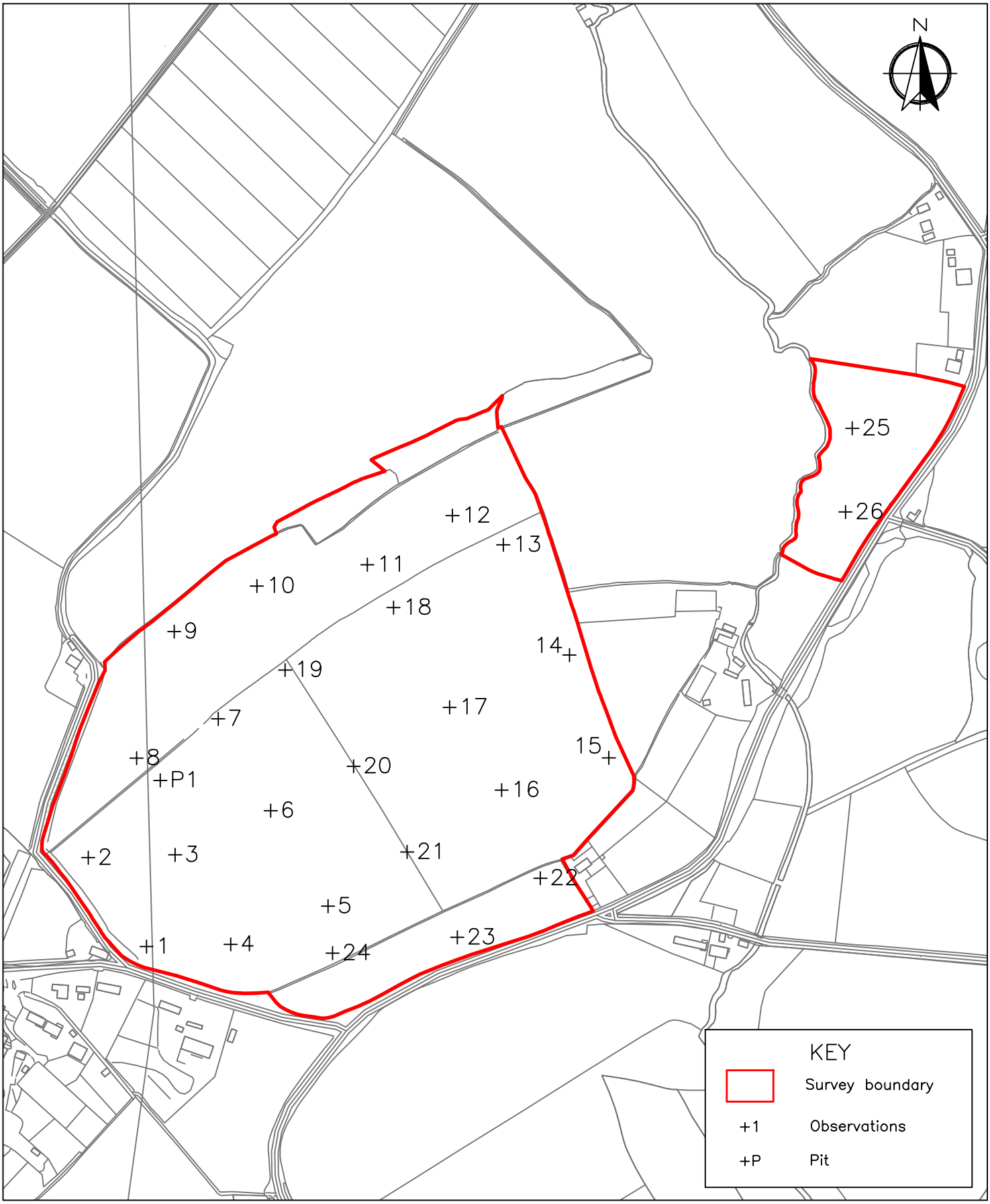
Topsoil over clay subsoil (extracted from pit)

Dense SPL clay subsoil

Mottled clay subsoil

WC IV Clay profile auger arisings

SPL Clay seen by auger



1:5,000

0 100m 200m

Drawing title OBSERVATION MAPPING	Ref. RAC/10757/1	Rev.			
Contract LAND AT NEWLANDS FARM, ARBORFIELD	Drawn by AGM	Checked by AIF			
	Scales 1:5,000@A4	Date 07/2025	Rev.	Comment	Date

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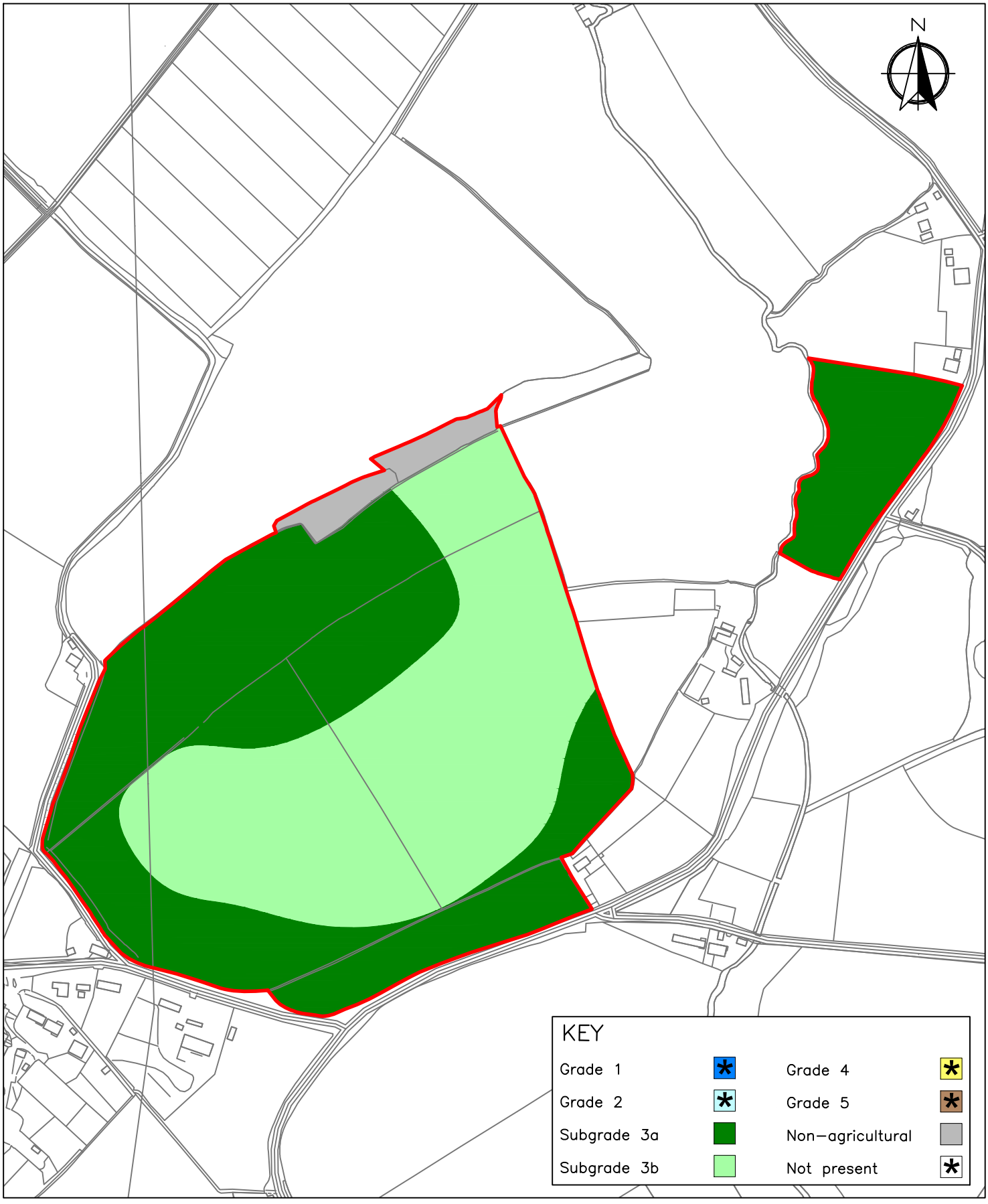

1:5,000

0 100m 200m

Drawing title AGRICULTURAL LAND CLASSIFICATION	Ref. RAC/10757/2	Rev.			
Contract LAND AT NEWLANDS FARM, ARBORFIELD	Drawn by AGM	Checked by AIF			
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