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**Merton College**

## **Agricultural Land Classification and Soil Resources**

**Land west of Yarnton, Oxfordshire**

**Beechwood Court,  
Long Toll, Woodcote,  
RG8 0RR**

**01491 684 233  
[readingagricultural.co.uk](http://readingagricultural.co.uk)**

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# 1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Merton College to investigate the Agricultural Land Classification (ALC) and soil resources of land to the west of Yarnton, Oxfordshire, by means of a detailed survey of soil and site 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 (1988)<sup>1</sup>, and summarised in Natural England's Technical Information Note 049<sup>2</sup>.
- 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 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. A very wide range of agricultural and horticultural crops can be grown, and yields are high and less variable than on land of lower quality.
- 1.5 Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but there may be reduced flexibility due to difficulties with the production of the more demanding crops. The level of yield is generally high but may be lower or more variable than Grade 1.
- 1.6 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).

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<sup>1</sup> **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.* MAFF Publications.

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

- 1.7 Subgrade 3a land is capable of consistently producing moderate to high yields of a narrow range of arable crops or moderate yields of a wide range of crops. Subgrade 3b is land capable of producing moderate yields of a narrow range of crops or lower yields of a wider range of crops or high yields of grass.
- 1.8 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.
- 1.9 Land which is classified as Grades 1, 2 and 3a in the ALC system is defined in Annex 2 of the National Planning Policy Framework (NPPF)<sup>3</sup> as best and most versatile (BMV) agricultural land.
- 1.10 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 on an Ordnance Survey base at a scale of One Inch to One Mile (1:63,360). The Provisional ALC map shows the site to be of 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 ..."*
- 1.11 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 MAFF guidelines.

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<sup>3</sup> Ministry of Housing, Communities and Local Government (2021). *National Planning Policy Framework*.

## 2 Site and climatic conditions

### General features, land form and drainage

- 2.1 The site extends to approximately 59.3ha of mostly agricultural land, predominantly in arable use, with a central portion of grassland. The site is bounded to the east by the settlement of Yarnton and Woodstock Road, to the north-west by Begbroke Wood and by other agricultural land on remaining boundaries.
- 2.2 Topography at the site is variable. In the west and south, the slopes are moderate and fall from west to east, between altitudes of around 95m and 75m above Ordnance Datum (AOD). In the east and north of the site, the land is gently sloping to level and lies at 70m to 75m AOD.

### Agro-climatic conditions

- 2.3 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point dataset at a representative altitude of 85m AOD, and are given in Table 1. The site has a mild climate with moderate to moderately large crop moisture deficits. The Field Capacity Day (FCD) regime is shorter than is average for lowland England and is favourable for providing opportunities for agricultural field work.

**Table 1:** Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	675mm
Accumulated Temperatures >0°C	1,399 day°
Field Capacity Days	145 days
Average Moisture Deficit, wheat	106mm
Average Moisture Deficit, potatoes	98mm

### Soil parent material and soil type

- 2.4 The solid geology is mapped by the British Geological Survey<sup>4</sup> as Oxford Clay which is overlain on the hilltop in the south of the site by Hanborough sand and gravel. The survey indicates that thin Head deposits of clay, sand and stone overlie the Oxford Clay on the lower-lying land.

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<sup>4</sup> **British Geological Survey (2021).** *Geology of Britain viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

- 2.5 The Soil Survey of England and Wales soil association mapping<sup>5</sup> (1:250,000 scale) shows the Denchworth association across the site. Denchworth soils are characterised by clayey profiles which are slowly permeable and seasonally waterlogged, commonly of Wetness Class (WC) IV<sup>6</sup>. Similar profiles with fine loamy topsoils may also be included.

### 3 Agricultural land quality

#### Soil Survey Methods

- 3.1 In total, 89 soil profiles were examined across a wider survey area using an Edelman (Dutch) or narrow gauge auger. Within the site boundaries, 57 soil profiles were examined at an observation density of one per hectare in accordance with guidance in Natural England's TIN049<sup>2</sup>. Three pits within the wider survey area were also excavated to examine subsoil structures. The locations of observations are indicated on Figure RAC7794-1. The following characteristics were assessed for each observable soil horizon up to a maximum of 120cm or any impenetrable layer:
- soil texture;
  - significant stoniness;
  - colour (including local gley and mottle colours);
  - consistency;
  - structural condition;
  - free carbonate; and
  - depth.
- 3.2 Four topsoil samples from the wider survey area were submitted for laboratory determination of particle size distribution, pH, organic matter content and nutrient contents (P, K, Mg). Results are given in Appendix 1.

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<sup>5</sup> **Soil Survey of England and Wales (1984).** *Soils of South East England* (1:250,000), Sheet 6

<sup>6</sup> **Jarvis et al. (1984).** *Soils and Their Use in South East England, Soil Survey of England and Wales*, Bulletin 15. Harpenden

- 3.3 Soil Wetness Class (WC) was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly 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 quality has been carried out according to the MAFF revised guidelines<sup>1</sup>. Soil profiles have been described according to Hodgson<sup>7</sup> which is the recognised source for describing soil profiles and characteristics according to the MAFF revised ALC guidelines.
- 3.6 Agricultural land quality at this site is mostly affected by soil wetness and workability. Most of the site is of moderate quality Subgrade 3b, with some better drained land in Subgrade 3a and Grade 2.
- 3.7 Three broad soil types were identified in the survey area but only two are dominant within the site. The third soil type is a loamy over gravel soil that is found to the south and south-west of Begbroke Wood outside the site boundary (and represented in Appendix 2 by Observation 65).

#### Type 1 - Clayey

- 3.8 The dominant soil type comprises clay loam or clay topsoils of 30cm average thickness. The colour varies from dark greyish brown (2.5Y4/2 or 10YR4/2 in the Munsell soil colour charts<sup>8</sup>), to brown (10YR4/3) and olive brown (2.5Y4/3). The structure is moderately well developed with coarse subangular blocky peds. Few roots and worms are observed in the topsoil, which is typically slightly stony and non-calcareous. Occasionally the topsoil is mottled.

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<sup>7</sup> Hodgson, J. M. (Ed.) (1997). *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

<sup>8</sup> Munsell Color (2009). *Munsell Soil Color Book*, Grand Rapids, MI, USA

- 3.9 Subsoil horizons are of stoneless heavy clay loam or clay. Upper and lower subsoils can often be distinguished by colour, commonly with pale brown or brown (10YR5/3 or 6/3, 2.5Y5/3) upper subsoil and grey or bluish grey (10Y6/1, 7.5GY6/1, 5Y7/2) lower subsoil from depths ranging between around 30 and 80cm. Both upper and lower subsoils display ochreous mottles and are gleyed. A coarse angular blocky structure and firm, dense consistency reduces the permeability of the subsoils, reducing them to WC IV, or less often WC III.
- 3.10 Under the climatic conditions of the site, soils of WC III or IV with heavy clay loam or clay topsoil are limited to Subgrade 3b by wetness and workability, as are profiles of WC IV with medium loam topsoils. Profiles of WC III with medium loamy topsoils are slightly less severely limited, to Subgrade 3a.

#### Type 2 - Loamy Over Clay

- 3.11 The topsoil within the second broad soil type is variable, including lighter textures of medium clay loam and sandy silt loam, as well as the dominant heavy clay loam and clay topsoil. The colour is dark brown to dark greyish brown (10YR3/3, 3/4 or 4/3) and the average depth is 26cm for the lighter and medium topsoil, or 30cm for the heavier topsoils. The topsoil has a moderately well developed fine angular blocky structure. Common fine roots are present. Stone content is slight at up to 10% in total. Some faint mottles are visible.
- 3.12 Upper subsoil is of similar texture to the respective topsoils and is distinguished by colour which includes dark yellowish brown (10YR4/4) to olive brown (2.5Y5/4 or 6/4), in addition to pale brown and brown. Upper subsoil is variably stony and has a coarse subangular blocky structure. The horizon is commonly gleyed, but moderately permeable.
- 3.13 Lower subsoils continue to have similar textures to their topsoil counterparts but are typically moderately to very stony, often between 15 and 30% by volume. In the north of the site the profiles are of WC I or II. The main limitation to these profiles is microrelief, as ridge and furrow features observed result in variable drainage and would give variable topsoil depth if cultivated level. These profiles are of Subgrade 3a.
- 3.14 Reduced permeability in the lower subsoils of the medium and heavy profiles results in most of these profiles being of WC III or IV. The resulting limitation is as for the dominant soil type, to Subgrade 3a or 3b.



3.15 The areas of each ALC grade are given in Table 2 and shown in Figure RAC7794-2.

**Table 2:** Agricultural land classification

Grade	Description	Area (ha)	%
2	Very good quality	2.1	4
3a	Good quality	23.3	39
3b	Moderate quality	33.6	57
Non-agricultural		0.3	0
Total		59.3	100

## **4 Assessment of the proposed development on agricultural land quality**

4.1 Paragraph 174 of the NPPF advises that planning policies and decisions should contribute to and enhance the natural and local environment by:

- protecting soils, amongst other matters, in a manner commensurate with their statutory status or identified quality in the development plan; and
- recognising the wider benefits from natural capital and ecosystem services, including the economic and other benefits of BMV agricultural land.

4.2 The NPPF goes on to say in footnote 58 to paragraph 175 that, in respect of plan making rather than individual decision taking, where significant development of agricultural land is demonstrated to be necessary, the use of poorer quality land should be used in preference to that of a higher quality.

4.3 The site comprises eight arable and grassland fields of variable size, and in typical lowland agricultural uses. The areas of BMV land within the site fall in three separate blocks, unrelated to the structure of fields, and are not farmed in any different or enhanced manner to the majority of the site which is not BMV land. There are therefore no readily identifiable benefits of the presence of BMV land at this site that are not provided by agricultural land of lower quality.

4.4 There is no detailed ALC information available from Natural England for any land surrounding Yarnton. The Provisional ALC map shows Grade 2 land to the north and south of Yarnton, undifferentiated Grade 3 land to the west, and Grade 4 land to the east and south-east. Given that the Grade 4 land is all within Flood Zone 3, it is clear that any significant development surrounding Yarnton should be directed to land to the west of the settlement to be in accordance with paragraph 175 of the NPPF.

## 5 Conclusion

- 5.1 This report describes the detailed soil and ALC survey that has been undertaken of land to the west of Yarnton. The survey was undertaken in accordance with the established methodology for classifying the quality of agricultural land.
- 5.2 The survey identified two dominant soil types within the site. The dominant type is a clayey soil with dark greyish brown, brown and olive brown clay loam or clay topsoil over a pale brown or brown heavy clay loam or clay upper subsoil and a grey or bluish grey clay lower subsoil. These soils are generally limited to Subgrade 3b by wetness and workability, with the better drained soils classified as Subgrade 3a.
- 5.3 The second soil type is a loamy over clayey soil and is also dominated by dark brown to dark greyish brown heavy clay loam topsoils but with lighter textures (medium clay loam and sandy silt loam) also included. The upper and lower subsoils are of similar texture to the respective topsoils, and are dark yellowish brown, olive brown, pale brown and brown. They become increasingly stony with depth. The reduced permeability in the lower subsoils limits these soils mostly to Subgrades 3a and 3b.
- 5.4 Most of the site is classified as moderate quality Subgrade 3b, with the remainder being better drained land in Subgrade 3a and Grade 2, which is amongst the BMV land.
- 5.5 The areas of BMV land within the site fall in three separate blocks, unrelated to the structure of fields, and are not farmed in any different or enhanced manner to the majority of the site which is not BMV land. In terms of the need to take into account the economic and other benefits of BMV land set out in paragraph 174 of the NPPF, there are no readily identifiable benefits of the presence of BMV land at this site that are not provided by agricultural land of lower quality. In terms of the need for necessary development within plan-making to be directed towards land of a lower agricultural quality, as set out in paragraph 175 and footnote 58 of the NPPF, this site is predominantly of lower quality, with available data showing that other land around Yarnton is either of higher agricultural quality to the north and south of the settlement or within the floodplain and unavailable for development.

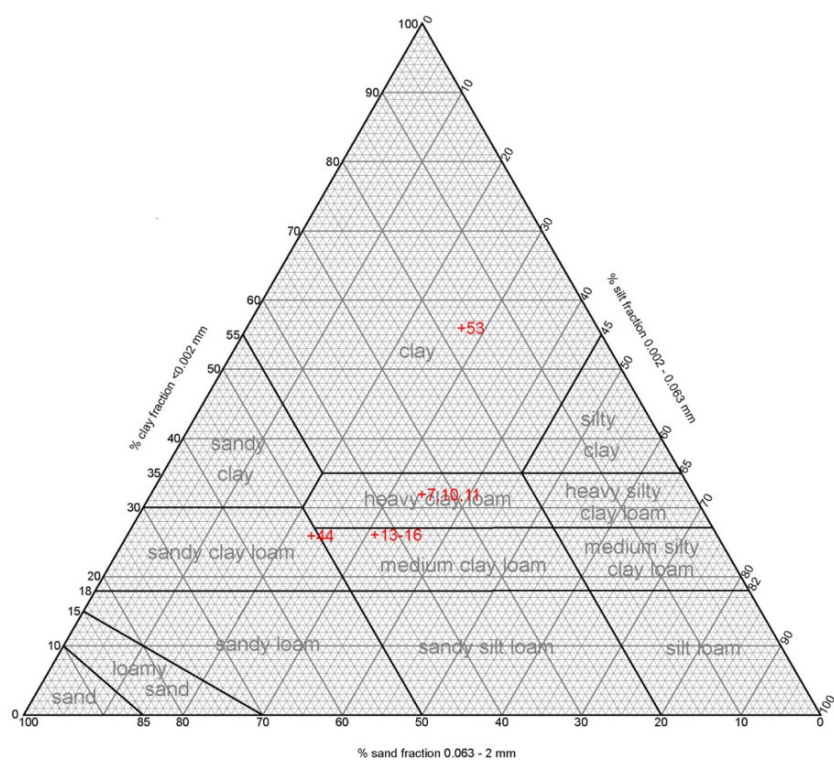
## Appendix 1: Laboratory Data

Determinand	7,10,11	13-16	44	53	Units
Sand 2.00-0.063 mm	34	43	51	17	% w/w
Silt 0.063-0.002 mm	34	31	23	27	%w/w
Clay <0.002 mm	32	26	26	56	% w/w
Organic Matter WB	7.1	5.3	5.0	5.0	% w/w
Texture	Heavy Clay	Medium Clay	Sandy Clay	Clay	% w/w
	Loam	Loam	Loam		

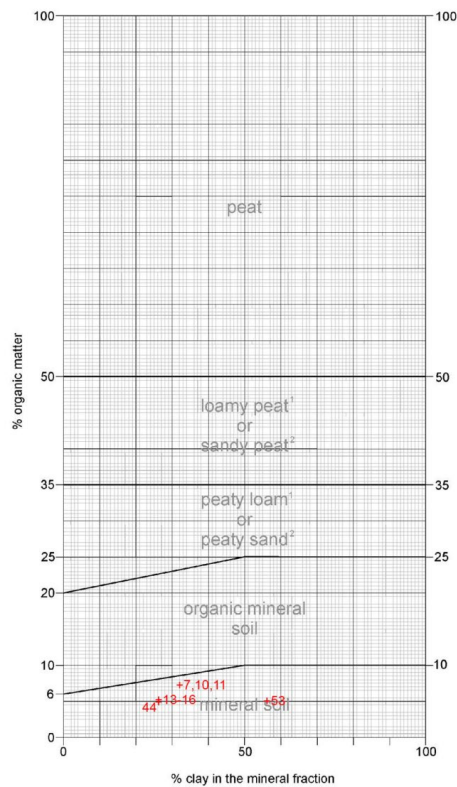
Determinand	7,10,11	13-16	44	53	Units
Soil pH	5.7	5.7	6.8	6.6	
Phosphorus (P)	6.2	38.0	21.2	12.2	mg/l (av)
Potassium (K)	97.5	208	104	263	mg/l (av)
Magnesium (Mg)	96.4	188	54.8	85.6	mg/l (av)

Determinand	7,10,11	13-16	44	53	Units
Phosphorus (P)	0	3	2	1	ADAS Index
Potassium (K)	1	2+	1	3	ADAS Index
Magnesium (Mg)	2	4	2	2	ADAS Index

## Soil Texture by Particle Size Distribution



## Organic Matter Class



<sup>1</sup> Less than 50% sand in the mineral fraction

<sup>2</sup> 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		
%	TA <sub>v</sub>	E <sub>av</sub>
hard	1	0.5
	10	7

Climate Data	
MDwheat	106
MDpotato	98
FCD	145

Wetness Class Guidelines	II	III	IV	V
SPL within 80cm, gleying within 40cm	>67cm	39-67cm	<39 cm	
SPL within 80cm, gleying at 40-70cm	>50cm	<50cm		
No SPL but gleying within 40cm	coarse subsoil	I	other cases	II

hard flint & pebble

AAR 675

Maximum depth of auger penetration is underlined

Site No.		Depth cm		Texture	CaCO <sub>3</sub>	Colour	Mottle colour	abund- ance	stone% hard	stone%	Struct- ure	APwheat mm	AP potato mm	Gley	SPL	WC	Wetness grade WE	Final Grade	Limiting Factor(s)	
1	T	0	20	mCL		10YR 3/4			4		-	35	35			II	2	3a	MR	
		20	40	mCL		10YR 6/4	Fe	com	10			29	29	y						
		40	65	mCL		2.5Y 5/4	Fe	com	15			27	34	y						
		65	120	SCL			FeMn	many	10		m/poor	45	6	y						
	Droughtiness grade(DR)											2	2							
												Total	135	104	MR.microrelief				ridge & furrow	3a
											MD	29	6							
2	T	0	20	mCL	non	2.5Y 4/3	Fe	com	4		-	35	35	y		III	3a	3a	WE MR	
		20	45	CL		2.5Y 5/3	Fe	com	15			34	34	y						
		45	120	C		7.5GY 7/1	Fe	pred	0		poor	56	33	Y	y					
		Droughtiness grade (DR)											2	2						
												Total	125	102	MR.microrelief				ridge & furrow	3a
												MD	19	4						
3	T	0	20	SZL		10YR 4/4			4		-	37	37			I	1	3a	MR	
		20	35	SZL		10YR 5/4			10		good	26	26							
		35	50	mCL		2.5Y 5/4	Mn	few	10			22	22							
		50	80	fSL			FeMn	com	20			32	29	y						

			80	120	SCL				40	poor	20	0							
										Total	136	113		MR.microrelief	ridge & furrow	3a			
										MD	30	15							
									Droughtiness grade(DR)		1	1							
4	T	0	22	SZL		10YR 3/4			4	-	40	40		/	1	3a		MR	
		22	40	SZL		10YR 5/4			15	good	29	29							
		40	50	SCL					30		11	11	y						
		50	120	SCL					40	poor	35	16							
										Total	115	97		MR.microrelief	ridge & furrow	3a			
										MD	9	-1							
									Droughtiness grade(DR)		2	2							
5	T	0	20	oCL		10YR 3/4			4	-	54	54		//	1	3a		MR	
		20	37	SZL		10YR 4/4			10	good	29	29							
		37	70	mCL		10YR 5/4	Mn	com	10		37	48	y						
		70	95	hCL			Mn		20	poor	14	0	y						
		95	120	C		10Y 7/2	Mn	many	0	poor	18	0	Y	y					
										Total	152	131		MR.microrelief	ridge & furrow	3a			
										MD	46	33							
									Droughtiness grade(DR)		1	1							
6	T	0	25	oCL	non	10YR 3/4			4	-	67	67		//	2	3a		MR	
		25	40	CL		10YR 4/4			10		22	22	y						
		40	55	SZL		10YR 5/4	Fe	com	25		17	20	Y						
		55	120	C		10Y 7/1	Fe	many	0	poor	46	20	Y	y					
										Total	152	128		MR.microrelief	ridge & furrow	3a			
						organic?				MD	46	30							
									Droughtiness grade (DR)		1	1							
7	T	0	25	oCL		10YR 3/4			4	-	67	67		//	1	3a		MR	
		25	40	mCL		10YR 4/4			10	good	29	29							
		40	55	SCL		10YR 5/4	Fe	few	10		18	20	y						



		65	120	C		10Y 7/1	Fe	many	0	poor	39	7	Y	y			
										Total	127	104					
										MD	21	6					
										Droughtiness grade (DR)	2	2					
12	T	0	32	CL	non	2.5Y 4/3			4	-	55	55			III	3b	3b
		32	41	C		2.5Y 6/3	Fe	many	5	m/poor	12	12	Y				
		41	75	C	slight	7.5GY 7/1	Fe	many	0	poor	29	38	Y	y			
		75	120	C	non	10Y 6/2	Fe	many	0	poor	32	0	Y	y			
										Total	129	106					
										MD	23	8					
										Droughtiness grade (DR)	2	2					
13	T	0	22	mCL	non	10YR 4/3			8	-	37	37			II	2	2
		22	35	CL		10YR 5/4	Fe	few	15		18	18					
		35	55	SCL	non	10Y 6/2	Fe	many	15		24	26	Y				
		55	120	SCL					40	poor	33	12	Y				
										Total	111	93					
										MD	5	-5					
										Droughtiness grade (DR)	2	2					
14	T	0	20	mCL	non	2.5Y 5/2	Fe	com	10	-	33	33			III	3a	3a
		20	35	mCL					10		22	22					
		35	55	hCL	non	2.5Y 6/3	Fe	com	10		26	29	y				
		55	75	C		5Y 5/2	Fe	many	10	poor	13	18	Y	y			
		75	120	C					30	poor	23	0	Y				
										Total	116	101					
										MD	10	3					
										Droughtiness grade (DR)	2	2					
15	T	0	30	hCL	non	2.5Y 4/2	Fe	com	4	-	52	52	y		III	3b	3b
		30	42	CL/C		2.5Y 6/2	Fe	com	5		18	18	y				
		42	75	C	non	10Y 7/1	Fe	many	0	poor	28	36	Y	y			
		75	120	C		7.5GY7/1	Fe	many	0	poor	32	0	Y	y			



										Total	130	107					
										MD	24	9					
										Droughtiness grade (DR)	2	2					
16	T	0	22	mCL	non	10Y 4/3			4	-	38	52		III	3a	3a	WE
		22	45	CL/C		2.5Y 5/4	Fe	com	10		33	18	y				
		45	72	C	non	2.5Y 6/2	Fe	com	0	poor	22	36	y	y			
		72	95	C		7.5GY7/1	Fe	many	0	poor	16	0	Y	y			
		95	120	MSt					0		13	0	Y	y			
											Total	122	107				
										MD	16	9					
										Droughtiness grade (DR)	2	2					
17	T	0	25	hCL	non	2.5Y 5/2	Fe	com	4	-	43	43	y	III	3b	3b	WE
		25	42	CL/C		2.5Y 6/2	Fe	many	5		26	26	Y				
		42	75	C	non	10Y 6/2	Fe	pred.	0	poor	28	36	Y	y			
		75	120	SL			Fe	many	10		45	0	Y				
											Total	142	106				
										MD	36	8					
										Droughtiness grade (DR)	1	2					
18	T	0	25	hCL	non	2.5Y 5/2	Fe	com	4	-	43	43	y	III	3b	3b	WE
		25	41	CL/C		2.5Y 6/2	Fe	many	5		24	24	y				
		41	60	C		10Y 7/1	Fe	many	0	poor	19	25	y	y			
		60	95	C		10GY 6/2	Fe	pred.	0	poor	25	13	Y	y			
	95	120	C	mod	10GY 6/2	Fe	pred.	0	poor	18	0	Y	y				
										Total	128	105					
										MD	22	7					
										Droughtiness grade (DR)	2	2					
19	T	0	20	mCL	non	2.5Y 4/2	Fe	com	8	-	33	33	y	II	2	2	DR WE
		20	35	mCL			Fe	com	20	good	26	26	y				
		35	70	hCL		2.5Y 6/4	Fe	com	15		38	48	Y				
		70	80	hCL					40	poor	4	0	Y	y			

		80	120	C					0	poor	28	0						
										Total	129	107						
										MD	23	9						
									Droughtiness grade (DR)	2	2			Deep stony pocket?				
20	T	0	25	hCL	non	2.5Y 4/2	Fe	com	4	-	43	43	y		///	3b	3b	WE
		25	42	CL/C		5Y 6/3	Fe	many	5		26	26	Y					
		42	60	C		5Y 6/3	Fe	com	0	poor	17	23	y	y				
		60	120	C	mod.	10GY 6/2	Fe	pred.	0	poor	42	13	Y	y				
										Total	129	106						
										MD	23	8						
									Droughtiness grade (DR)	2	2							
21	T	0	25	hZCL	non	2.5Y 5/2	Fe	com	8	-	44	44	y		/V	3b	3b	WE
		25	40	C		5Y 6/3	Mn	com	5	poor	19	19	Y	y				
		40	65	C		5Y 6/3	Fe	com	10	m/poor	23	33	y					
		65	85	C	mod.	10GY 6/2	Fe	pred.	5	poor	13	6	Y	y				
		85	120	C					30	poor	18	0	Y	y				
										Total	117	102						
										MD	11	4						
									Droughtiness grade (DR)	2	2			Rush patches				
22	T	0	32	hCL	non	2.5Y 4/2	Fe	com	4	-	55	55	y		///	3b	3b	WE
		32	45	CL/C		2.5Y 6/4	Fe	com	0		21	21	y					
		45	62	C		2.5Y 6/2	Fe	many	0	poor	15	22	y	y				
		62	120	C	non	10GY 6/2	Fe	pred.	0	poor	41	10	Y	y				
										Total	132	109						
										MD	26	11						
									Droughtiness grade (DR)	2	1							
23	T	0	20	mCL		10YR 4/3	Fe	few	4	-	35	35			///	3a	3a	WE MR
		20	35	mCL		2.5Y 5/4	Fe	few	10		22	22	y					
		35	45	C		2.5Y 5/3	FeMn	com	10		15	15	y					
		45	55	C		2.5Y 5/1	FeMn	many	10	poor	9	12	y	y				

			55	120	C			30	poor	33	14	y					
								Total		113	97		MR.microrelief	ridge & furrow	3a		
								MD		7	-1						
								Droughtiness grade(DR)		2	2						
24	T	0	22	hCL	10YR 4/3			4	-	38	38		III	3b	3b	WE	
		22	35	hCL	2.5Y 5/4	Fe	few	10		19	19						
		35	45	C	5Y 5/3	Fe	com	10	poor	12	12	y	y				
		45	75	hCL	2.5Y 5/1	FeMn	many	10		30	36	y					
		75	120	C				30	poor	23	0	y	y				
								Total		121	105		MR.microrelief	ridge & furrow	3a		
								MD		15	7						
								Droughtiness grade(DR)		2	2						
25	T	0	25	hCL	2.5Y 4/2	Fe	com	4	-	43	43	y	III	3b	3b	WE	
		25	45	C	2.5Y 5/1	Fe	many	10		29	29	y					
		45	75	C	5Y 5/3	Fe	com	5	poor	23	31	y	y				
		75	85	SCL				10		9	0	y					
		85	120	C	non 7.5GY6/1	Fe	com	0	poor	25	0	Y	y				
								Total		129	103		MR.microrelief	ridge & furrow	3a		
								MD		23	5						
								Droughtiness grade(DR)		2	2						
28	T	0	32	C	10YR4/2			5	-	52	52		IV	3b	3b	WE	
		32	120	C	2.5Y5/2	Fe	com	1	poor	72	49	y	y				
								Total		124	101						
								MD		18	3						
								Droughtiness grade(DR)		2	2						
30	T	0	35	hCL	10YR4/3			8	-	58	58		IV	3b	3b	WE	
		35	120	C	10YR5/3	Fe	com	1	poor	68	45	y	y				
								Total		126	103						
								MD		20	5						
								Droughtiness grade(DR)		2	2						

31	T	0	28	hCL	10YR4/3			8	-	47	47		IV	3b	3b	WE
		28	66	C	2.5Y5/3	Fe	many	1	poor	39	49	y	y			
		66	120	C	10YR5/1	Fe	com	1	poor	37	5	y	y			
										Total	123	101				
										MD	17	3				
Droughtiness grade(DR)										2	2					
32	T	0	30	hCL	10YR4/3			8	-	50	50		III	3b	3b	WE
		30	55	C	10YR5/3	Fe	com	5		34	38	y				
		55	120	C	10YR5/1	Fe	com	1	poor	45	19	y	y			
										Total	129	107				
										MD	23	9				
Droughtiness grade(DR)										2	2					
33	T	0	20	mCL	10YR4/3			4	-	35	35		II	2	2	WE
		20	60	hCL	10YR5/3	Fe	few	5		55	61					
		60	120	C	2.5Y5/3	Fe	many	1	poor	42	13	y	y			
										Total	132	109				
										MD	26	11				
Droughtiness grade(DR)										2	1					
34	T	0	30	hCL	10YR4/3			5	-	51	51		IV	3b	3b	WE
		30	120	C	10YR5/1	Fe	many	1	poor	74	52	y	y			
										Total	126	103				
										MD	20	5				
		Droughtiness grade(DR)										2	2			
35	T	0	35	mCL	10YR4/2			2	-	62	62		II-III	2/3a	2/3a	WE
		35	50	C	10YR4/3	Fe	com	5		23	23					
		50	120	C	10Y6/1	Fe	many	1	poor	49	26	y	y			
										Total	133	110				
										MD	27	12				
Droughtiness grade(DR)										2	1					
36	T	0	28	mCL	10YR4/2			2	-	62	62		IV	3b	3b	WE
		28	120	C	10Y6/1	Fe	many	1	poor	49	26	y	y			

										Total	133	110					
										MD	27	12					
										Droughtiness grade(DR)	2	1					
37	T	0	30	mCL	10YR4/2			2	-	53	53		IV	3b	3b	WE	
		30	80	C	10YR5/3	Fe	com	10	poor	43	47	y	y				
		80	120	C	10Y6/1	Fe	many	1	poor	28	0	y	y				
											Total	123	100				
											MD	17	2				
										Droughtiness grade(DR)	2	2					
38	T	0	30	mCL	10YR4/2			2	-	53	53		IV	3b	3b	WE	
		30	45	C	2.5Y5/3	Fe	com	20	poor	16	16	y	y				
		45	120	C	2.5Y5/3	Fe	com	1	poor	55	32	y	y				
											Total	124	101				
											MD	18	3				
										Droughtiness grade(DR)	2	2					
39	T	0	30	mCL	10YR4/2			2	-	53	53		IV	3b	3b	WE	
		30	45	C	2.5Y5/3	Fe	com	20	poor	16	16	y	y				
		45	120	C	2.5Y5/3	Fe	com	1	poor	55	32	y	y				
											Total	124	101				
											MD	18	3				
										Droughtiness grade(DR)	2	2					
45	T	0	22	hCL	10YR4/3			10	-	36	36		IV	3b	3b	WE	
		22	120	C	2.5Y5/3	Fe	com		poor	85	62	y	y				
											Total	121	98				
											MD	15	0				
											Droughtiness grade(DR)	2	2				
46	T	0	25	mCL	10YR4/2			2	-	44	44		IV	3b	3b	WE	
		25	80	C	10YR5/3	Fe	com	10	poor	49	53	y	y				
		80	120	C	10Y6/1	Fe	many	1	poor	28	0	y	y				
											Total	120	97				
											MD	14	-1				

47	T	0	40	hCL	10YR4/3			10	-	62	62		III	3b	3b	WE
		40	120	C	2.5Y5/3	Fe	com		poor	65	42	y	y			
									Total	127	104					
									MD	21	6					
									Droughtiness grade(DR)	2	2					
65	T	0	35	mSL	7.5YR4/2			2	-	58	58		I	1	2	DR
		35	65	cSL	7.5YR4/4	Fe	few	15		35	41					
		65	120	cSL	7.5YR4/4	Fe	few	20		49	7					
									Total	142	106					
									MD	36	8					
									Droughtiness grade(DR)	1	2					
73	T	0	30	mCL	10YR4/3			2	-	53	53		IV	3b	3b	WE
		30	80	C	10YR5/3	Fe	com	15	poor	40	45	y	y			
		80	120	C	10Y6/1	Fe	many		poor	28	0	y	y			
									Total	121	98					
									MD	15	0					
									Droughtiness grade(DR)	2	2					
74	T	0	30	mCL	10YR4/3			2	-	53	53		II	2	2	WE
		30	70	C	10YR5/3	Fe	com	15		41	55	y				
		70	120	C	2.5Y5/3	Fe	com		poor	35	0	y	y			
									Total	129	108					
									MD	23	10					
									Droughtiness grade(DR)	2	2					
75	T	0	40	hCL	10YR5/2			2	-	71	71		III	3b	3b	WE
		40	120	C	2.5Y5/2	Fe	com		poor	62	39	y	y			
									Total	133	110					
									MD	27	12					
									Droughtiness grade(DR)	2	1					
76	T	0	40	hCL	10YR4/3			2	-	71	71		III	3b	3b	WE
		40	70	C	2.5Y5/3	Fe	com	5	poor	26	37	y	y			
		70	120	C	10Y6/1	Fe	com		poor	35	0	y	y			
									Total	131	108					

									MD	25	10					
									Droughtiness grade(DR)		2	2				
77	T	0	30	hCL	10YR4/3			2	-	53	53		IV	3b	3b	WE
		30	70	C	2.5Y5/3	Fe	com	5	poor	38	50	y	y			
		70	120	C	10Y6/1	Fe	com		poor	35	0	y	y			
									Total	126	103					
									MD	20	5					
									Droughtiness grade(DR)		2	2				
78	T	0	40	hCL	10YR4/2			2	-	71	71		III	3b	3b	WE
		40	120	C	2.5Y5/3	Fe	com		poor	62	39	y	y			
									Total	133	110					
									MD	27	12					
									Droughtiness grade(DR)		2	1				
79	T	0	30	hCL	10YR4/2			2	-	53	53		III	3b	3b	WE
		30	40	hCL	10YR4/2			30		12	12					
		40	120	C	2.5Y5/3	Fe	com	30	poor	45	28	y	y			
									Total	109	93					
									MD	3	-5					
									Droughtiness grade(DR)		3a	2				
80	T	0	40	mCL	10YR4/3			5	-	69	69		III	3a	3a	WE
		40	70	C	2.5Y5/3	Fe	com	20	poor	22	32	y	y			
		70	120	C	10Y6/1	Fe	com	10	poor	32	0	y	y			
									Total	122	100					
									MD	16	2					
									Droughtiness grade(DR)		2	2				
81	T	0	40	mCL	10YR4/3			5	-	69	69		III	3a	3a	WE
		40	80	C	10YR5/2	Fe	com		poor	34	39	y	y			
		80	120	C	10Y6/1	Fe	com		poor	28	0	y	y			
									Total	131	108					
									MD	25	10					
									Droughtiness grade(DR)		2	2				
82	T	0	35	C	10YR5/2			2	-	58	58		II	3b	3b	WE

		35	90	C	mod	2.5Y5/2	Fe	many		56	56	y					
		90	120	C		10Y6/1	Fe	com	poor	21	0	y	y				
									Total	135	114						
									MD	29	16						
									Droughtiness grade(DR)	2	1						
83	T	0	26	C		10YR5/2		2	-	43	43		IV	3b	3b		WE
		26	45	C		10YR5/2	Fe	many	poor	25	25	y	y				
		45	120	C		10Y6/1	Fe	com	poor	56	33	y	y				
									Total	124	101						
									MD	18	3						
									Droughtiness grade(DR)	2	2						
84	T	0	32	mCL		10YR4/2		1	-	57	57		II	2	2		WE
		32	80	C		7.5YR5/3	Fe	com		53	61	y					
		80	120	C		7.5YR5/3	Fe	com		32	0	y					
									Total	142	118						
									MD	36	20						
									Droughtiness grade(DR)	1	1						
85	T	0	27	hCL		10YR4/2		1	-	48	48		IV	3b	3b		WE
		27	70	C		10YR5/2	Fe	com	poor	44	56	y	y				
		70	120	C		10Y6/1	Fe	com	poor	35	0	y	y				
									Total	127	104						
									MD	21	6						
									Droughtiness grade(DR)	2	2						
86	T	0	32	mCL		10YR4/2		1	-	57	57		II	2	2		WE
		32	60	C		10YR5/3	Fe	com	10	33	41	y					
		60	120	C		10YR5/3	Fe	com	30	35	12	y					
									Total	125	109						
									MD	19	11						
									Droughtiness grade(DR)	2	1						
87	T	0	22	hCL		10YR4/2		1	-	39	39		III	3b	3b		WE
		22	45	C		10YR5/3	Fe	com	20	30	30	y					
		45	120	C		10Y6/1	Fe	many	poor	56	33	y	y				



										Total	125	102					
										MD	19	4					
										Droughtiness grade(DR)		2	2				
88	T	0	32	hCL	10YR5/3			1	-	57	57		IV	3b	3b	WE	
		32	60	C	10YR5/6	Fe	com	20	poor	25	30	y					
60	120	C	10Y6/1	Fe	many	30	poor	30	9	y	y						
										Total	112	96					
										MD	6	-2					
										Droughtiness grade(DR)		2	2				
89	T	0	32	hCL	10YR4/2			1	-	57	57		IV	3b	3b	WE	
		32	120	C	2.5Y5/3	Fe	many		poor	72	49	y	y				
										Total	129	106					
										MD	23	8					
										Droughtiness grade(DR)		2	2				
Pit 3	T	0	20	mCL	10YR4/2			10	-	33	33		III	3a	3a	WE	
		20	40	hCL	2.5Y5/3	Fe	com	30		23	23	y					
40	70	C	2.5Y5/3	Fe	com	5	poor	26	37	y	y						
70	120	C	10Y6/1	Fe	many		poor	35	0	y	y						
										Total	116	93					
										MD	10	-5					
										Droughtiness grade(DR)		2	2				

### Appendix 3: Soil Pit Photographs

Pit 1





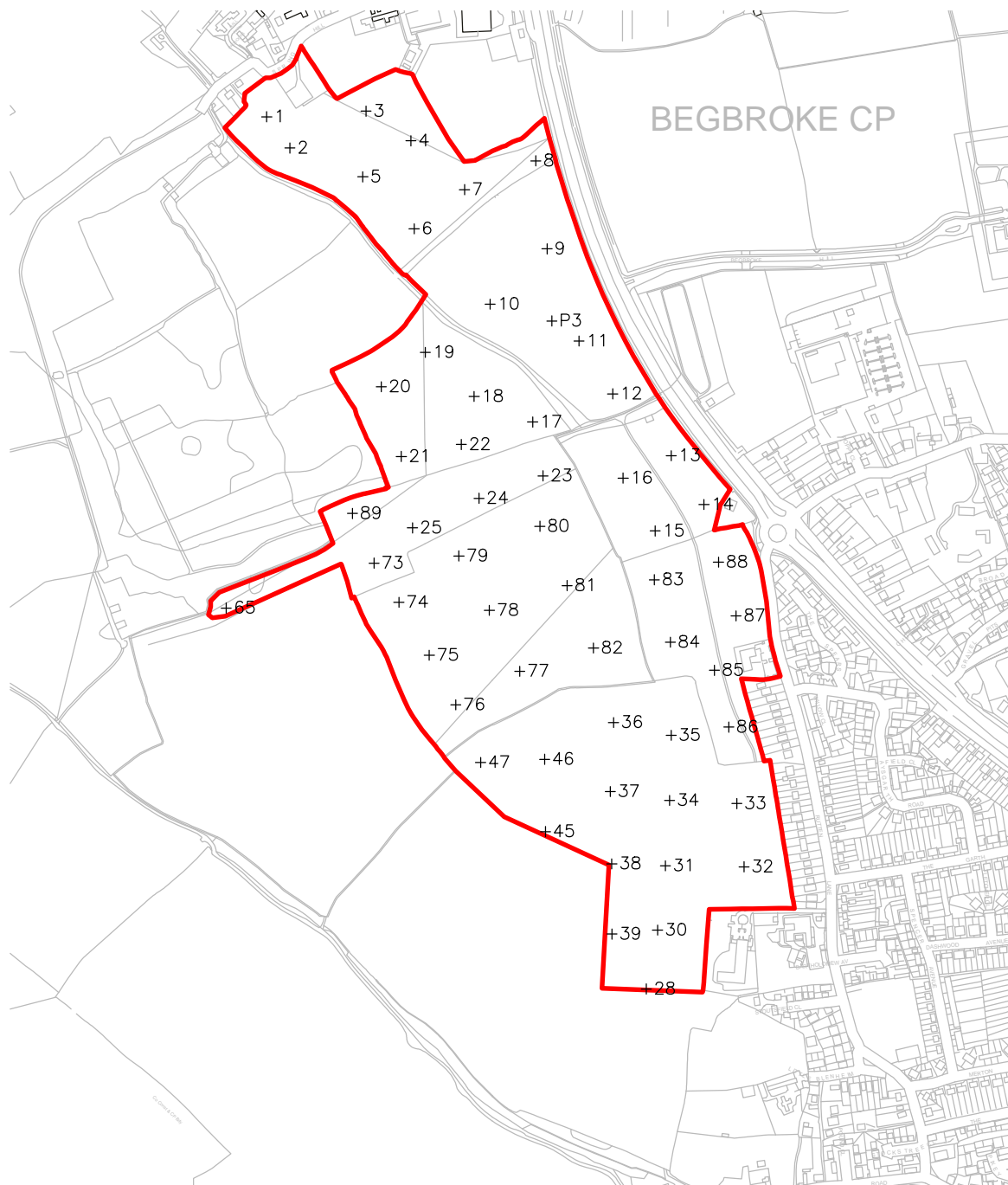
Pit 2





Pit 3





## KEY



Survey Area


+1 Auger Observation

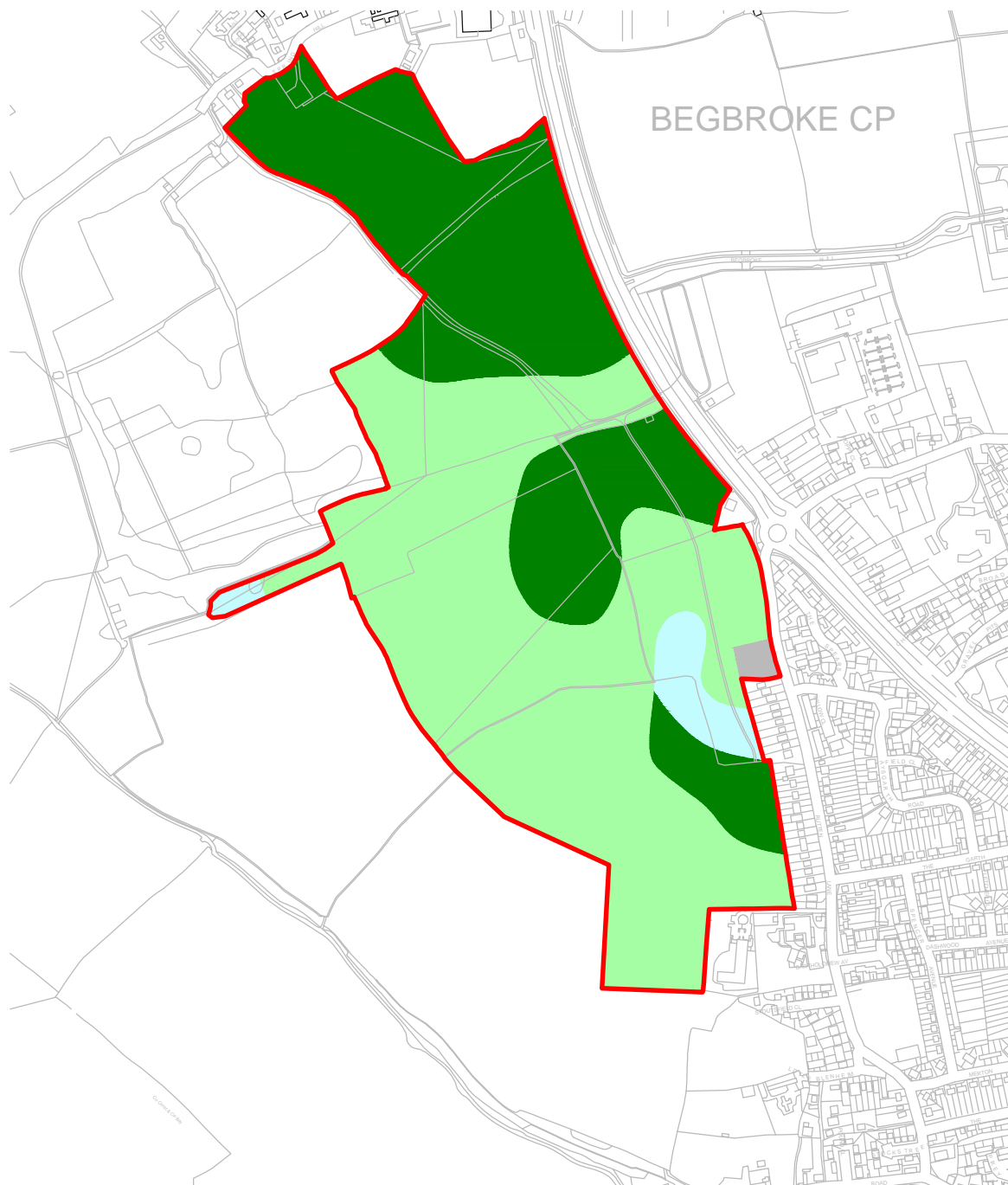
+P Pit

1:10,000



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Drawing title OBSERVATION MAPPING	Ref. RAC7794-1	Rev.				Reading Agricultural Consultants Ltd Gate House Beechwood Court Long Toll Woodcote RG8 0RR 01491 684233 www.reading-ag.com
Site LAND AT YARNTON, OXFORDSHIRE	Drawn by AGM	Checked by AIF				
Client MERTON COLLEGE, OXFORD	Scales 1:10,000@A4	Date 10/2020				
			Rev.	Comment	Date	 <b>READING AGRICULTURAL CONSULTANTS</b>



## KEY

Grade 1		Grade 4	
Grade 2		Grade 5	
Subgrade 3a		Non-agricultural	
Subgrade 3b		Not present	

1:10,000



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Drawing title AGRICULTURAL LAND CLASSIFICATION	Ref. RAC7794-2	Rev.				Reading Agricultural Consultants Ltd Gate House Beechwood Court Long Toll Woodcote RG8 0RR 01491 684233 www.reading-ag.com
Site LAND AT YARNTON, OXFORDSHIRE	Drawn by AGM	Checked by AIF				
Client MERTON COLLEGE, OXFORD	Scales 1:10,000@A4	Date 10/2020				
			Rev.	Comment	Date	

