



November 2024

**Castle Green Homes Limited**

**Agricultural Land Classification and Soil Resources**

at

**Peulwys Lane, Old Colwyn**

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

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## 1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Castle Green Homes Limited to investigate the Agricultural Land Classification (ALC) and soil resources of land at Peulwys Lane, Old Colwyn, 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<sup>1</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 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 very severe limitations which restrict use to permanent pasture or rough grazing.
- 1.5 Land which is classified as Grades 1, 2 and 3a is defined in paragraph 3.58 of Planning Policy Wales<sup>2</sup> as the best and most versatile (BMV) agricultural land.
- 1.6 Natural Resources Wales with the Welsh Government has published a Predictive ALC Map for Wales<sup>3</sup>. The map is designed on a 50m grid. Criteria including climate, slope, soil wetness, droughtiness and stone contents have been considered and used to determine the most likely limitation to agricultural land quality within each grid square. The map predicts this site to be

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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.* [Agricultural Land Classification of England and Wales: Revised criteria for grading the quality of agricultural land - ALC011](#)

<sup>2</sup> **Welsh Government (2024).** Planning Policy Wales, Edition 12, February 2024  
<https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf>

<sup>3</sup> **Welsh Government (2024).** *DataMapWales.* <https://datamap.gov.wales/maps/new#/>

mostly Grade 2 in the east, Subgrade 3a in the west, a band of Grade 4 in the centre and Subgrade 3b in between.

- 1.7 However, as explained by the Welsh Government's Frequently Asked Questions on ALC<sup>4</sup>, the only way to accurately determine the agricultural grade of land is by a detailed field survey in accordance with the current ALC guidelines. This survey follows the established methodology and guidelines for carrying out ALC surveys.

## 2 Site and climatic conditions

### General features, land form and drainage

- 2.1 The site extends to approximately 15.2ha, most of which is agricultural grassland. The site is bounded by Peulwys Lane to the north and west, by other agricultural land to the south, and by a residential property and woodland to the east.
- 2.2 The topography is characterised by a moderate to steep slope with a westerly aspect. The altitudes at the site are between around 70m above Ordnance Datum in the west and 150m AOD in the east.
- 2.3 DataMapWales<sup>3</sup> shows no significant flood risk at the site from surface water or rivers.

### Agro-climatic conditions

- 2.4 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set at a representative altitude of 100m AOD and are given in Table 1. The climate at the site is wet and fairly cool with moderately small to moderate moisture deficits. The number of Field Capacity Days (FCD) is large and is unfavourable for providing opportunities for agricultural field work. There is however no overriding climatic limitation to the ALC.

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

Parameter	Measurement
Grid Ref	SH 87500 77700
Altitude	100m AOD
Average Annual Rainfall	818mm
Accumulated Temperatures >0°C	1,361 day°
Field Capacity Days	191 days
Average Moisture Deficit, wheat	88mm
Average Moisture Deficit, potatoes	74mm

<sup>4</sup> Welsh Government (2020). *Agricultural Land Classification, Frequently Asked Questions*.

<https://gov.wales/sites/default/files/publications/2020-06/agricultural-land-classification-frequently-asked-questions.pdf>

### **Soil parent material and soil type**

2.5 The bedrock geology mapped by the British Geological Survey<sup>5</sup> in the west of the site is the Elwy Formation which includes disturbed beds of striped silty mudstones and sandstones. The Ffernant Formation is mapped in the east and includes red, purple and variegated silty mudstones, siltstones and sandstones. Superficial till deposits lie over most of the bedrock, other than across the steepest slopes, and comprise an unsorted mix of material ranging from clay to boulders.

2.6 The Soil Survey of England and Wales soil association mapping<sup>6</sup> (1:250,000 scale) shows the Denbigh 1 association in the west and the East Keswick 3 association in the east. Both associations are characterised by clay loam textures throughout and are differentiated by subsoil stone content and type. The soil profiles are typically well drained, in Wetness Class (WC) 1<sup>7</sup>.

## **3 Agricultural land quality**

### **Soil survey methods**

3.1 In total, 15 soil profiles were examined using an Edelman (Dutch) auger at an observation density of one per hectare in accordance with the established recommendations for ALC surveys. One observation pit was also excavated to examine subsoil structures. The locations of observations are shown on Figure RAC/10535/1. 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

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<sup>5</sup> British Geological Survey (2024). Geology Viewer <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

<sup>6</sup> Soil Survey of England and Wales (1984). *Soils of Wales* (1:250,000), Sheet 2

<sup>7</sup> Rudeforth et al (1984). *Soils and Their Use in Wales*. Soil Survey of England and Wales Bulletin 11, Harpenden.

- depth.

3.2 One topsoil sample was 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 Wetness Class (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 FCD 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<sup>1</sup>. Soil profiles have been described according to Hodgson<sup>8</sup> which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.

3.6 The main limitations to agricultural land quality are soil wetness and workability, which is heavily influenced by the climatic conditions of the site, and the gradient of slope. The site is classified as Grade 2 where there is no gradient limitation, and Subgrade 3b or Grade 4 where there are gradient limitations.

3.7 The topsoil is consistently deep, medium clay loam which is mostly dark brown or brown (7.5YR3/3, 7.5YR3/4, 7.5YR4/3 or 10YR4/3 in the Munsell soil colour charts<sup>9</sup>). The stone content is low at around 5% by volume. The topsoil has a weakly developed, fine subangular blocky structure with common fibrous roots.

3.8 The upper subsoils are primarily heavy clay loam with some medium clay loams and few sandy clay loams. The colour is similar to the topsoils or is otherwise reddish brown (5YR4/3). The upper subsoil is slightly stony, friable and has a weakly developed, medium subangular blocky structure. There is a wavy boundary to the lower subsoil.

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<sup>8</sup> **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

<sup>9</sup> **Munsell Color (2009).** *Munsell Soil Color Book*. Grand Rapids, MI, USA

3.9 The lower subsoil is heavy clay loam which is reddish brown or brown (5YR5/3, 7.5YR5/3 or 10YR5/3) and occasionally mottled. The lower subsoil is slightly stony, firm and continues to have a weakly developed, medium subangular blocky structure. Pockets of clay are sometimes present at depth. The profiles are permeable throughout and are all assessed as WC I. Due to the large number of FCD, with medium clay loam topsoil, there is a wetness and workability limitation to Grade 2.

3.10 The gradient of the slopes was measured in the field with a clinometer and also cross-referenced with a Lidar plan of the site. Aligning with the predictive mapping, the centre of the site is limited to Grade 4 where the gradients measure between 14° and 16°. Either side of this band, where the slopes measure between 7° and 11°, there is a gradient limitation to Subgrade 3b.

3.11 The areas of each ALC grade at the site are given in Table 2 and their distribution is shown in Figure RAC/10535/2. Photographs taken at the site are given in Appendix 3.

**Table 2:** Agricultural land classification

Grade	Description	Hectares	%
Grade 2	Very good quality	8.0	53
Subgrade 3b	Moderate quality	5.0	33
Grade 4	Poor quality	2.0	13
Non-agricultural		0.2	1
Total		15.2	100

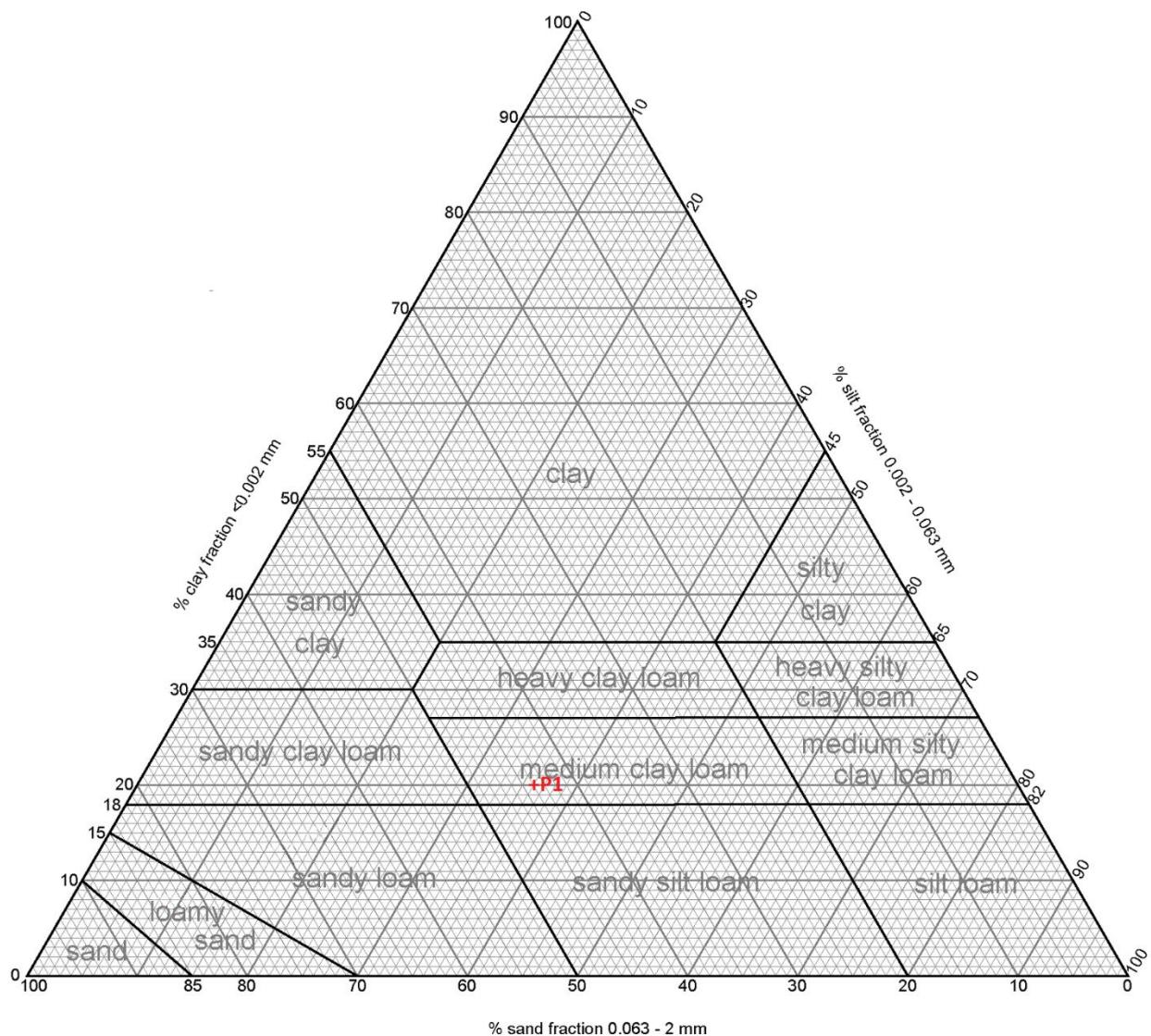
## Appendix 1: Laboratory Data

Determinand	Pit 1	Units
Sand 2.00-0.063 mm	44	% w/w
Silt 0.063-0.002 mm	36	% w/w
Clay <0.002 mm	20	% w/w
Organic Matter	3.0	% w/w
Texture	Medium clay loam	

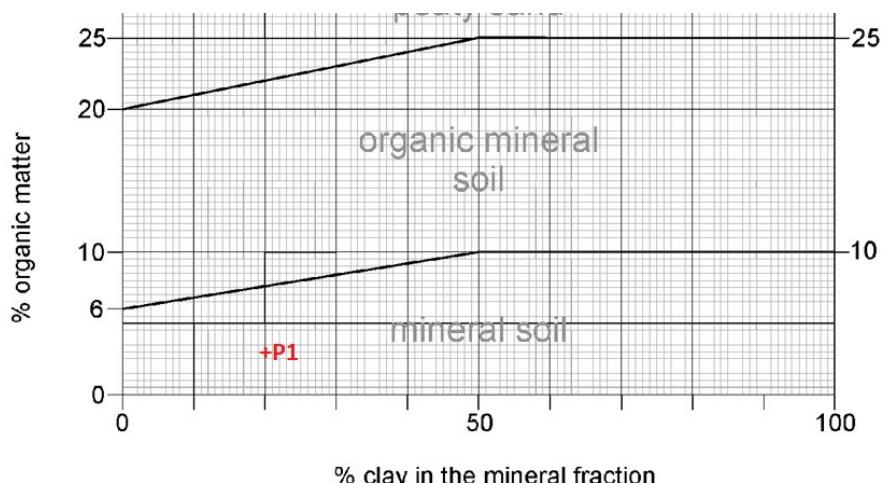
Determinand	Pit 1	Units
Soil pH	6.3	
Phosphorus (P)	13.6	mg/l (av)
Potassium (K)	69.7	mg/l (av)
Magnesium (Mg)	32.3	mg/l (av)

Determinand	Pit 1	Units
Phosphorus (P)	1	ADAS Index
Potassium (K)	1	ADAS Index
Magnesium (Mg)	1	ADAS Index

## Soil Texture by Particle Size Analysis



## Organic Matter Class



## Appendix 2:

## Soil Profile Summaries and Droughtiness Calculations

Wetness calculations are made 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
.		

Climate Data		
MDwheat	88	
MDpotato	74	
FCD	191	

Wetness Class Guidelines		II	III	IV	V
SPL within 80cm, gleying within 40cm			>51cm	<51cm	
SPL within 80cm, gleying at 40-70cm		>69cm	<69cm		
No SPL but gleying within 40cm		coarse subsoil	I	other cases	II

hard flint & pebble

Maximum depth of auger penetration is underlined

Site No.	T	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
1	T	0 <u>40</u>	mCL		10YR4/3			5		-	68	68	n	n	I	2	3b	GR
		40 <u>120</u>	hCL					10			78	43	n	n				
										Total	146	112						
										MB	58	38						
										Droughtiness grade (DR)	1	1						
2	T	0 <u>40</u>	mCL		7.5YR3/4						72	72	n	n	I	2	2	WE
		40 <u>50</u>	hCL		7.5YR3/4	Mn	few	5			15	15	n	n				
		50 <u>60</u>	hCL		10YR5/3	Och	com	5			10	15	y	n				
		60 <u>120</u>	hCL					10			55	14	n	n				
										Total	151	117						
										MB	63	43						
										Droughtiness grade (DR)	1	1						
3	T	0 <u>40</u>	mCL		7.5YR3/3			5			68	68	n	n	I	2	2	WE
		40 <u>45</u>	mCL		7.5YR3/3			5			8	8	n	n				
		45 <u>55</u>	hCL		5YR4/3			5			12	15	n	n				
		55 <u>120</u>	hCL								65	24	n	n				
										Total	153	115						
										MB	65	41						
										Droughtiness grade (DR)	1	1						

												gradient 6°		
												gradient up to ne 11°		
												gradient downslope to buildings 10°		
<b>4</b>	T	0	40	mCL	5YR4/3	5	68	68	n	n	/	2	<b>3b</b>	GR
		40	90	SCL	5YR4/3	5	52	43	n	n				
		90	<u>100</u>	hCL	5YR4/3	5	10	0	n	n				
		100	120	hCL	5YR4/3		20	0	n	n				
												Total	<b>150</b>	<b>111</b>
												MB	62	37
												Droughtiness grade (DR)	1	1
<b>5</b>	T	0	40	mCL	7.5YR4/3	5	68	68	n	n	/	2	<b>3b</b>	GR
		40	<u>50</u>	mCL	5YR4/3	5	15	15	n	n				
		50	100	hCL		10	46	29	n	n				
		100	120	hCL			20	0	n	n				
												Total	<b>149</b>	<b>112</b>
												MB	61	38
												Droughtiness grade (DR)	1	1
<b>6</b>	T	0	40	mCL	7.5YR4/3	5	68	68	n	n	/	2	<b>3b</b>	GR
		40	<u>45</u>	mCL	7.5YR3/3	Mn	few	5	8	8	n	n		
		45	100	hCL				10	53	36	n	n		
		100	120	hCL					20	0	n	n		
												Total	<b>149</b>	<b>112</b>
												MB	61	42
												Droughtiness grade (DR)	1	1
<b>7</b>	T	0	35	mCL	7.5YR4/3	5	60	60	n	n	/	2	<b>2</b>	WE
		35	40	mCL	5YR4/3	5	8	8	n	n				
		40	<u>50</u>	hCL	5YR5/3	Mn	com	5	15	15	y	n		
		50	120	hCL					70	32	n	n		
												Total	<b>153</b>	<b>115</b>
												MB	65	41
														°

											Droughtiness grade (DR)		1		1		stone stopped auger at 50cm						
8	T	0	40	mCL	7.5YR4/3			5	68	68	n	n	/	2	2	WE							
		40	45	mCL	5YR4/3			5	8	8	n	n											
		45	80	hCL	5YR5/3			Mn	occ	5	36	38	y	n									
		80	120	hCL						40	0	n	n										
											Total	152	114										
											MB	64	40	°									
											Droughtiness grade (DR)		1	1	stone stopped auger at 80cm								
9	T	0	40	mCL	7.5YR3/3			5	68	68	n	n	/	2	3b	GR							
		40	60	mCL	7.5YR4/3			5	25	30	n	n											
		60	120	hCL				5	57	15	n	n											
											Total	150	114										
											MB	62	40	°									
											Droughtiness grade (DR)		1	1	difficult to auger 60cm small stones								
10	T	0	30	mCL	7.5YR3/3			5	51	51	n	n	/	2	4	GR							
		30	120	mCL				5	97	61	n	n											
											Total	149	112										
											MB	61	38	soil powder dry slope 14-16°									
											Droughtiness grade (DR)		1	1									
11	T	0	40	mCL	7.5YR3/3			5	68	68	n	n	/	2	2	WE							
		40	50	hCL	5YR4/3			5	15	15	n	n											
		50	120	hCL				10	64	29	n	n											
											Total	147	112										
											MB	59	38	auger stopped at 50cm									
											Droughtiness grade (DR)		1	1									

50	90	hCL	7.5YR5/3	Och	com	5	38	30	y	n				
90	120	hCL				5	29	0	n	n				
							Total	<b>150</b>	<b>114</b>					
							MB	62	40					
							Droughtiness grade (DR)	1	1					
<b>13</b>	T	0	40	mCL	10YR4/3	5	68	68	n	n	/	2	<b>3b</b>	GR
		40	70	hCL	10YR4/4	5	34	46	n	n				
		70	90	hCL	10YR5/3	Och	com	5	19	0	y	n		
		90	120	hCL		5	29	0	n	n			°	
							Total	<b>150</b>	<b>114</b>					
							MB	62	40					
							Droughtiness grade (DR)	1	1					
<b>14</b>	T	0	40	mCL	10YR4/3	5	68	68	n	n	/	2	<b>4</b>	GR
		40	70	hCL	10YR4/4	5	34	46	n	n				
		70	90	hCL	10YR5/3	Och	com	5	19	0	y	n		
		90	120	hCL		5	29	0	n	n				
							Total	<b>150</b>	<b>114</b>					
							MB	62	40					
							Droughtiness grade (DR)	1	1					
<b>15</b>	T	0	40	mCL	7.5YR4/4	5	68	68	n	n	/	2	<b>2</b>	WE
		40	45	SCL	5YR4/6	Mn	com	5	7	7	n	n		
		45	65	SCL	5YR4/3			5	21	29	n	n		
		65	100	mS	5YR4/4			5	17	3	n	n		
		100	120	mS				10	0	n	n			
							Total	<b>124</b>	<b>107</b>					
							MB	36	33					
							Droughtiness grade (DR)	1	1					

### Appendix 3:

### Pit Description and Site Photographs

<b>Pit 1 – near observation 6, SH87720 77833, east of hedge in field with observations 3 and 7, slight slope, grass</b>	
0-40 cm	Medium clay loam, 7.5YR 3/3, weakly developed, fine subangular blocky structure, common fibrous roots, topsoil stone content 3% >2cm 2%, >6cm 0% rounded hard stones
40-60 cm	Heavy clay loam, 7.5YR 4/3, weakly developed, medium subangular blocky, porosity >0.5% greater than 0.5mm diameter, friable, stone content 3% small rounded hard stones, wavy boundary (depth variable 55cm to 70cm)
60-70 cm	Heavy clay loam, 7.5YR5/3, weakly developed, medium subangular blocky, porosity >0.5% greater than 0.5mm diameter, firm, stone content 5% small rounded hard stones
70- 100 cm	Heavy clay loam, 7.5YR5/3, few ochreous mottles, pockets of clay present.
	Wetness Class I, Grade 2



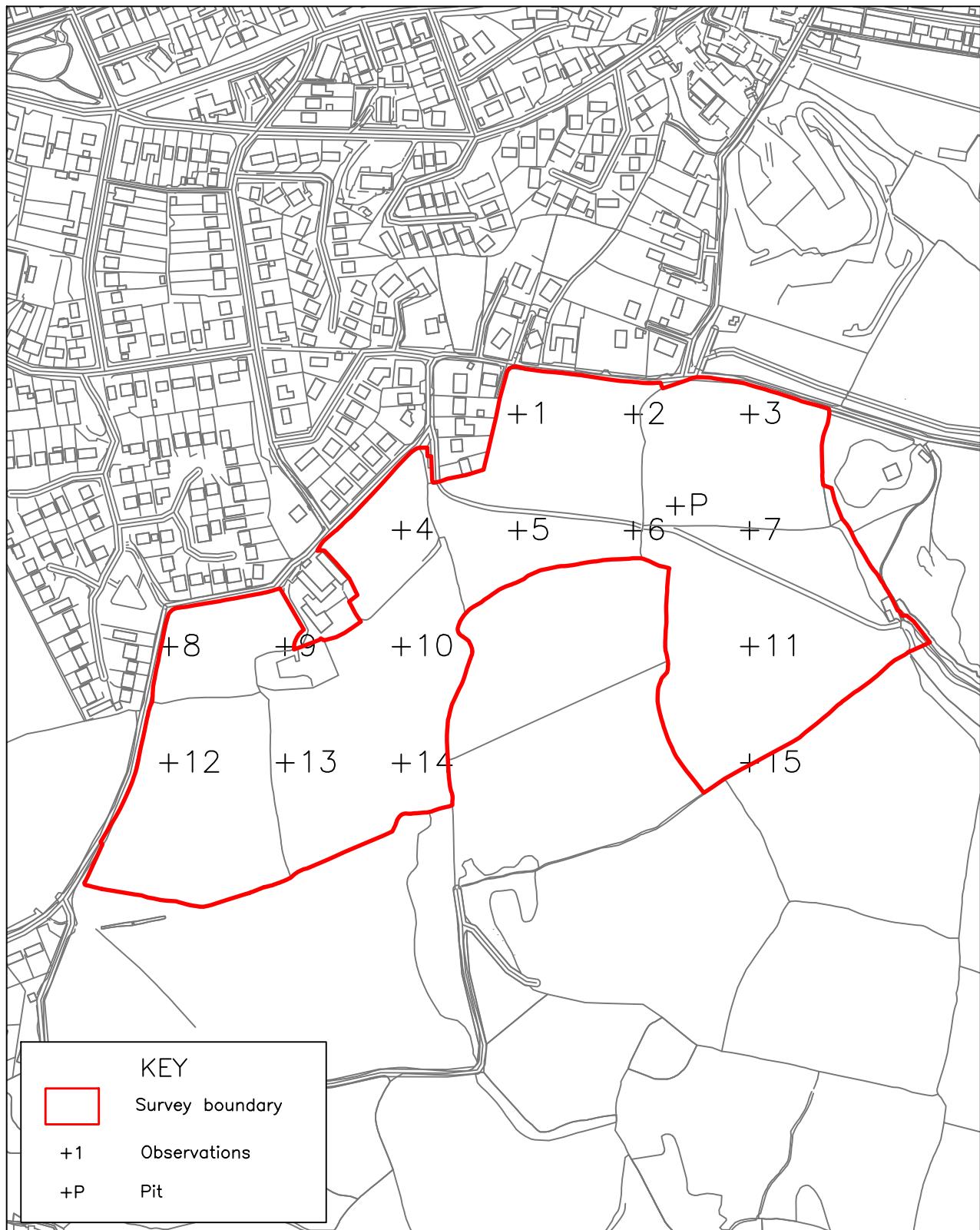
Pit 1



Site view toward Observation 3



Subsoil structure (50cm+)



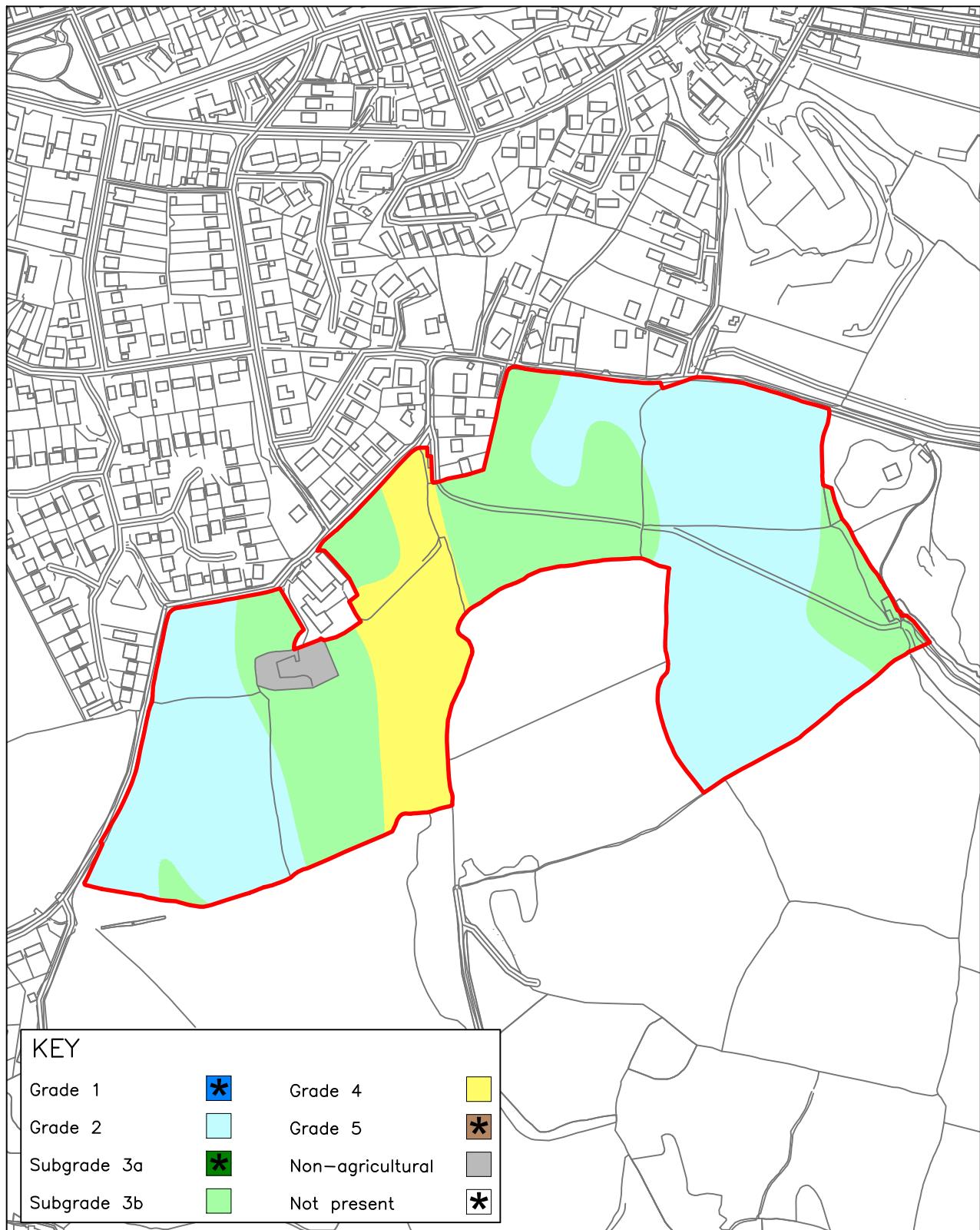
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#### KEY

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

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