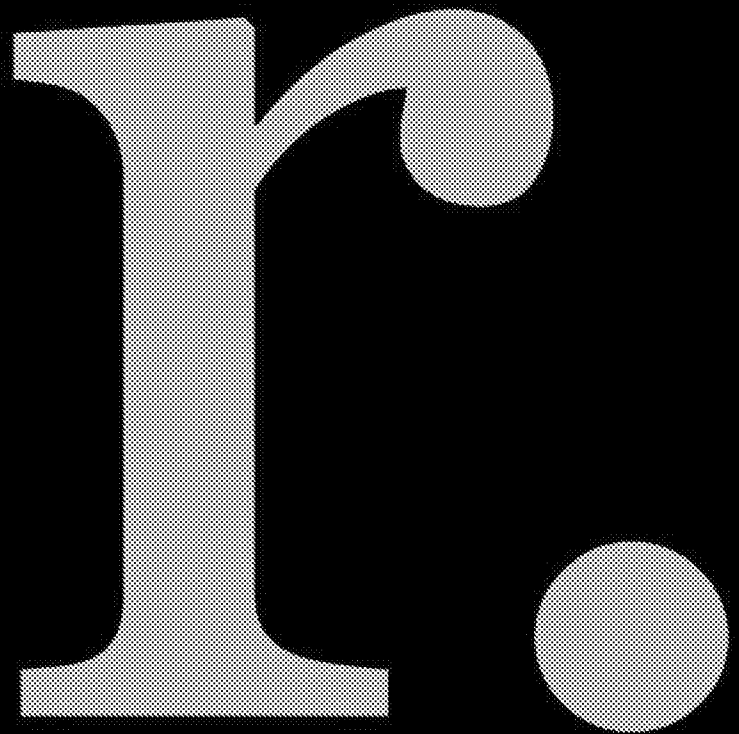


reside.

Land west of Fontwell Avenue, Eastergate

Agricultural Land Classification and Soil Resources





April 2020

Reside Developments Limited

Agricultural Land Classification and Soil Resources

at

**Land west of Fontwell Avenue,
Eastergate**

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

1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Reside Developments Limited to investigate the Agricultural Land Classification (ALC) and soil resources of land west of Fontwell Avenue, Eastergate 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)¹, and summarised in Natural England's Technical Information Note 049².
- 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, and Grade 5 is very poor quality land, with severe limitations due to adverse soil, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile agricultural land.
- 1.5 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 as Grade 2. 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

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

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

on the same information is available. These are more appropriate for the strategic use originally intended ..."

- 1.6 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.

2 Site and climatic conditions

General features and land form

- 2.1 The site extends to approximately 1.55ha of grass paddocks, and is bounded by Level Mare Lane to the north, Fontwell Avenue to the east, Northfields Farm to the south and other grass paddocks to the west.
- 2.2 Topography across the site is relatively flat at around 17m above Ordnance Datum (AOD).

Agro-climatic conditions

- 2.3 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 17m AOD, and are given in Table 1. The site has relatively warm and moist climate, with large crop moisture deficits. The number of Field Capacity Days is above average for lowland England and is slightly unfavourable for providing opportunities for agricultural field work.

Table 1: Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	786mm
Accumulated Temperatures >0°C	1,529 day°
Field Capacity Days	161 days
Average Moisture Deficit, wheat	115mm
Average Moisture Deficit, potatoes	112mm

Soil parent material and soil type

- 2.4 The principal underlying geology mapped by the British Geological Survey³ (BGS) includes the Lambeth Group Member across northern and central areas, with the London Clay Formation in the south. The Lambeth Group Member comprises vertically and laterally variable sequences

³ **British Geological Survey (2020).** *Geology of Britain viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

mainly of clay, some silty or sandy, with some sands and gravels. The London Clay Formation is characterised by blue-grey or grey brown clay with varying levels of silt and some sand.

- 2.5 Superficial head deposits overlie the bedrock across the site and include poorly sorted angular rock debris and/or clayey hillwash material.
- 2.6 The Soil Survey of England and Wales soil association mapping⁴ (1:250,000 scale) shows the Hamble 2 association across the southern and central parts of the site, with the Charity 1 association mapped to the north.
- 2.7 The Hamble 2 association is characterised by deep, stoneless, well drained silty soils, locally over gravel. These soils are permeable, well drained and typically assessed as Wetness Class (WC) I⁵.
- 2.8 Charity 1 association soils are characterised by well drained, fine silty and fine silty over clayey soils, locally very flinty with some soils shallow over flint gravel. They are typically assessed as WC I.

3 Agricultural land quality

Soil survey methods

- 3.1 Two soil profiles were examined across the site, using an Edelman (Dutch) auger at an observation density of approximately one per hectare in accordance with the established recommendations for ALC surveys². The use of augers was impeded greatly by high stone contents in the soil profile. One soil pit was also excavated to examine subsoil structures and verify soil characteristics where observation with an auger was not possible. The locations of observations are indicated on Figure RAC8612-1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120 cm or any impenetrable layer:
 - soil texture;
 - significant stoniness;
 - colour (including localised mottling);
 - consistency;

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 No.15

- structural condition;
- free carbonate; and
- depth.

- 3.2 A topsoil sample from the pit 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 inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15 cm 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 MAFF revised ALC guidelines (1988)¹. Soil profiles have been described according to Hodgson (1997)⁶ which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.
- 3.6 There is one soil type present at the site. Topsoil is brown (10YR4/3 in the Munsell soil colour charts⁷), medium silty clay loam to an average depth of 30cm. The topsoil is moderately stony at 27% by volume; the stone is flint and is variable in size with 17% over 2cm. Structure is coarse granular to fine subangular, with a friable consistency.
- 3.7 The upper subsoil has a similar texture and colour to the topsoil, and extends to a depth of approximately 46cm below ground level, as observed in the pit. Stone content within this horizon is slightly lower than the topsoil at 17%. Structure is coarse granular with a friable consistency. The lower subsoil comprises brown (10YR5/3) medium silty clay loam to depth. Stone content is approximately 30% increasing with depth. Structure is fine subangular blocky and friable.

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

- 3.8 Soils are permeable, well drained and assessed as WC I. Relatively high topsoil stone content over 2cm limits the profiles to Subgrade 3a, increasing wear and tear on machinery as well as affecting cultivation and crop growth. Soils are limited to the same extent by droughtiness with moderate crop moisture deficits resulting in limited available water through the growing season.
- 3.9 The assessment of all agricultural land is shown in Figure RAC8612-2 and set out below in Table 2.

Table 2: Agricultural Land Classification

Grade	Description	Area (ha)	%
3a	Good quality	1.50	97
Non-agricultural		0.05	3
Total site		1.55	100

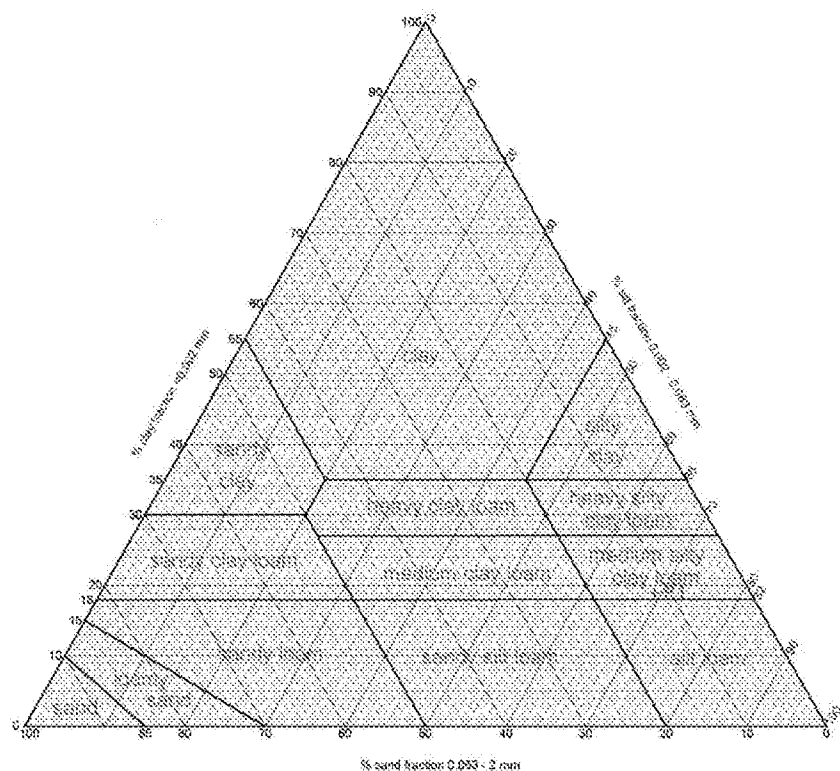
Appendix 1: Laboratory Data

Determinand	P1 Topsoil	Units
Sand 2.00-0.063 mm	12	% w/w
Silt 0.063-0.002 mm	69	% w/w
Clay <0.002 mm	19	% w/w
Organic Matter	5.7	% w/w
Texture	Medium silty clay loam	

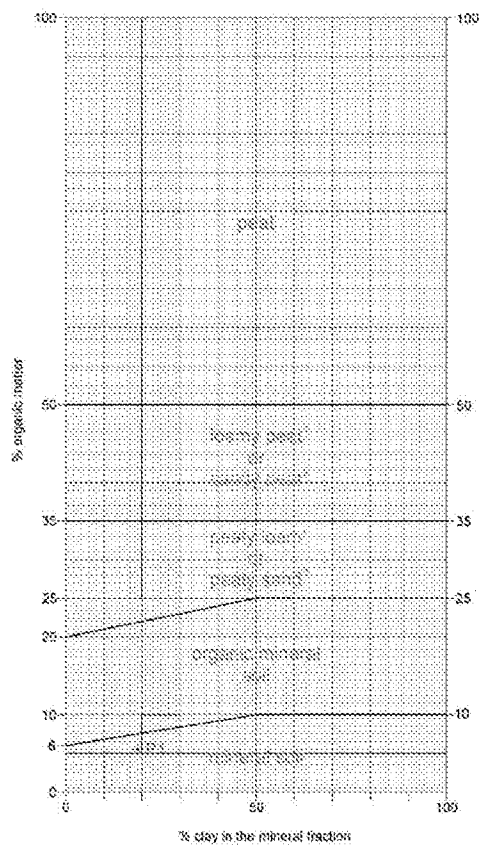
Determinand	P1 Topsoil	Units
Soil pH	5.7	
Phosphorus (P)	8.6	Mg/l (av)
Potassium (K)	238	Mg/l (av)
Magnesium (Mg)	61.1	Mg/l (av)

Determinand	P1 Topsoil	Units
Phosphorus (P)	0	ADAS Index
Potassium (K)	2+	ADAS Index
Magnesium (Mg)	2	ADAS Index

Soil Texture by Particle Size Analysis



Organic Matter Class



* Less than 50% sand in the mineral fraction

* 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 v	Eav
hard	1	0.5

Climate Data	
MDwheat	115
MDpotato	112
FCD	161

Wetness Class Guidelines	II	III	IV	V
SPL within 80cm, gleying within 40cm	>71cm	43-71cm	<43cm	
SPL within 80cm, gleying at 40-70cm	>56cm	<56cm		
No SPL but gleying within 40cm	coarse subsoil	/	other cases	/

		hard	flint & pebble		Maximum depth of auger penetration is <u>underlined></u>															
Site		Depth	Texture	CaCO ₃	Colour	Mottle	abund-	stone	stone	Struct-	APwheat	AP potato	Gley	SPL	WC	Wetness	Final	Limiting		
No.		cm				colour	ance	%	%	ure	mm	mm				grade WE	Grade	Factor(s)		
1	T	0	30	mZCL	10YR4/3			27			42	42	n	n	/	1	3a	DR ST		
		30	46	mZCL	10YR4/3			16			23	23	n	n						
		46	60	mZCL	10YR5/3			30			12	17	n	n						
		60	120	mZCL	10YR5/3			35			40	11	n	n						
		Total									118	94								
		MD									3	-18								
		Droughtiness grade (DR									3a	3a								
2	T	0	30	mZCL	10YR4/3			27			42	42	n	n	/	1	3a	DR ST		
		30	46	mZCL	10YR4/3			16			23	23	n	n						
		46	60	mZCL	10YR5/3			30			12	17	n	n						
		60	120	mZCL	10YR5/3			35			40	11	n	n						
		Total									118	94								
		MD									3	-18								
		Droughtiness grade (DR									3a	3a								
P1	T	0	32	mZCL	10YR4/3			27			45	45	n	n	/	1	3a	DR ST		
		32	46	mZCL	10YR4/3			16			20	20	n	n						
		46	60	mZCL	10YR5/3			30			12	17	n	n						
		60	120	mZCL	10YR5/3			35			40	11	n	n						
		Total									118	94								
		MD									3	-18								
		Droughtiness grade (DR									3a	3a								

Appendix 3: Site Photographs



Pit 1. Indication of topsoil stone.



Pit 1. Topsoil



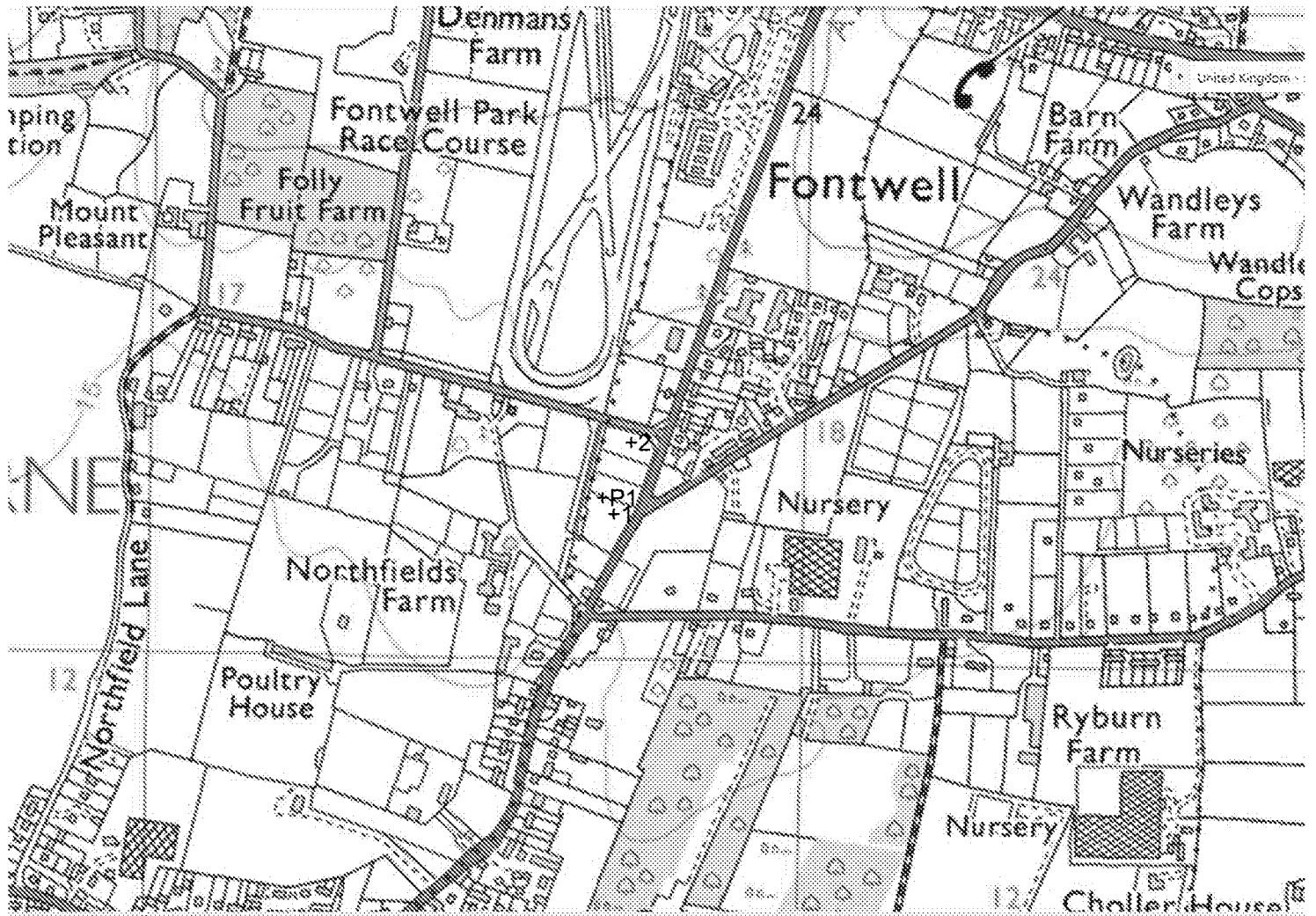
Pit 1. Upper Subsoil



Pit 1. Upper Subsoil



Pit 1. Pit Wall

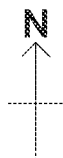


KEY: OBSERVATIONS

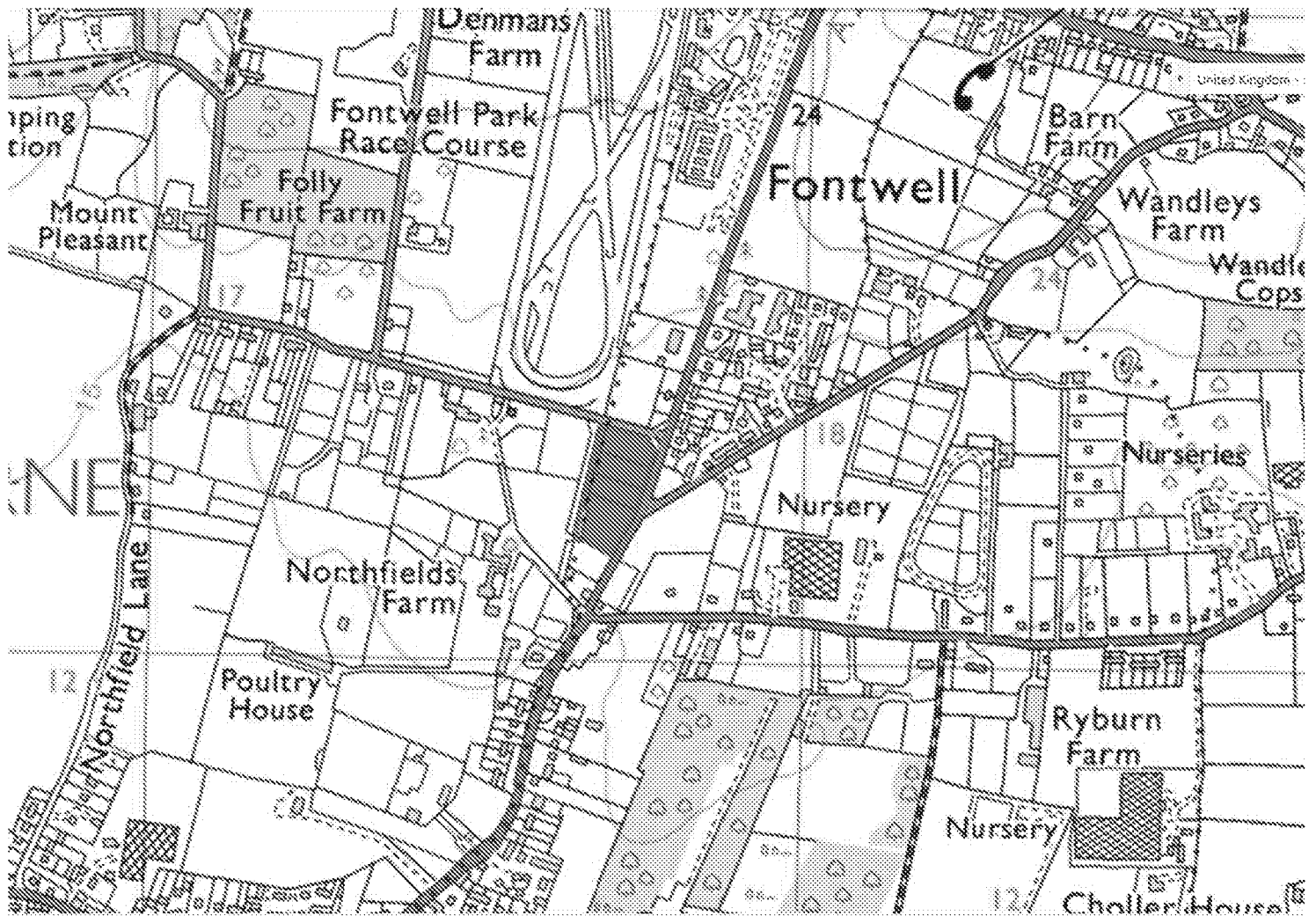
-  Survey area
- +1** Observations
- +P** Pit

0m 100m

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Contract LAND WEST OF FONTWELL AVENUE, EASTERGATE	Drawn by AGM	Checked by AIF				
	Scales 1:5,000@A4	Date APRIL 2020				
			REV1	RLB update	04/2020	
			Rev.	Comment	Date	

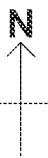


KEY: ALC GRADES

	Grade 1 - excellent quality	} Best and most versatile land		Subgrade 3b - moderate quality
	Grade 2 - very good quality			Grade 4 - poor quality
	Subgrade 3a - good quality			Grade 5 - very poor quality
	Not Present			Non-Agricultural

0m 100m

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