

**AGRICULTURAL QUALITY
OF LAND OFF BARLESTONE ROAD
NEWBOLD VERDON**

Report 2237/1

24th November, 2023

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**AGRICULTURAL QUALITY
OF LAND OFF BARLESTONE ROAD, NEWBOLD VERDON**

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Report 2237/1
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24th November, 2023

SUMMARY

An agricultural land quality survey has been undertaken of 16.3 ha of land north of Barlestone Road, Newbold Verdon, Leicestershire in November 2023.

The land has two main soil types: permeable loamy soils and loams over clay. The site is a combination of Grade 2 and Subgrade 3a agricultural quality, limited by wetness/workability constraints, droughtiness or topsoil stone content.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 16.3 ha of land north of Barlestone Road, Newbold Verdon, Leicestershire. The report is based on a survey of the land in November 2023.

SITE ENVIRONMENT

- 1.2 The survey area comprises a number of grassland fields, grazed by horses as part of the Newbold Equestrian Centre. The site is bordered to the south by Barlestone Road and on all other sides by adjoining agricultural land. The site is level, with an average elevation of approximately 130 m AOD.

PUBLISHED INFORMATION

- 1.3 British Geological Survey 1:50,000 scale information records the underlying geology as Edwalton Member Mudstone, overlain by sand and gravel deposits.
- 1.4 The National Soil Map (published at 1:250,000 scale)¹ records most of the land as within the Arrow Association, typically comprising deep permeable coarse loamy soils affected by groundwater.
- 1.5 In 2020 Hinckley and Bosworth Borough Council undertook an Agricultural Land Study² to review the quality of land adjoining the fourteen main settlements within the Borough. The survey of land adjoining Newbold Verdon shows the Application Site to comprise mainly Grade 2 land, with smaller areas of Subgrade 3a in the south and west.

¹ Ragg, J.M., *et al.*, (1984). *Soils and their Use in Midland and Western England*, Soil Survey of England and Wales Bulletin No. 12, Harpenden.

² Hinckley and Bosworth Borough Council, (2020). *Agricultural Land Study May 2020*. Available at: <[Overview | Agricultural Land Study May 2020 | Hinckley & Bosworth Borough Council \(hinckley-bosworth.gov.uk\)](#)>

2.0 Soils

2.1 A soils and agricultural quality survey was carried out in November 2023 in accordance with MAFF (1988) Agricultural Land Classification guidelines³. It was based on observations at alternate intersects of a 100 m grid, providing in-fill to the semi-detailed survey previously carried out for the Council. This gives an overall density of one observation per hectare. During the survey, soils were examined by hand augerings and pits to a maximum depth of 1.0 m. A log of the sampling points from both surveys and a map (Map 1) showing their location is in an appendix to this report.

2.2 The main variation in soil types is described below.

PERMEABLE LOAMY SOILS

2.3 These soils are dominant across the site. They comprise sandy clay loam or medium sandy loam topsoil over a permeable subsoil of a similar texture, which often becomes sandier with depth. The subsoil is often moderately stony and in places shows evidence of seasonal waterlogging through gleying (pale colours and ochreous mottles). These soils are judged to be freely-draining (Soil Wetness Class I/II).

2.4 Example profiles are described from observation points 10 and 15 (see Map 1) in an appendix to this report.

LOAMS OVER CLAY

2.5 These soils were identified in the Hinckley and Bosworth Borough Council survey and occur in a small areas in the west of the site. They comprise slightly stony sandy clay loam topsoil and permeable upper subsoil, over slowly permeable reddish clay. The subsoils show evidence of seasonal waterlogging (pale ped faces, ferri-manganiferous concentrations and greyish mottles). These soils are judged imperfectly draining (Soil Wetness Class III).

³MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

3.0 Agricultural land quality

- 3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.
- 3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification⁴.
- 3.3 The relevant site data an average elevation of 130 m and a central point at grid reference SK 446, 043 is given below.
- Average annual rainfall: 694 mm
 - January-June accumulated temperature >0°C 1324 day°
 - Field capacity period 161 days
(when the soils are fully replete with water) early Nov – mid Apr
 - Summer moisture deficits for: wheat: 95 mm
potatoes: 82 mm
- 3.4 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF⁵. There are no overriding climatic limitations at this locality.

SURVEY RESULTS

- 3.5 The agricultural quality of the land is primarily determined by wetness/workability, droughtiness or topsoil stone content. Other factors have been assessed but do not affect the land grade. Land of grades 2 and 3 has been identified.

Grade 2

- 3.6 This land grade makes up most of the site. The deep permeable loams with gleyed subsoil are restricted by slight wetness/ workability constraints, as the moderately high topsoil clay content means access with machinery is likely to be restricted in winter under the local climate.

⁴Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁵MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

- 3.7 Also included is land with coarse loamy subsoils below the topsoil that are restricted by slight droughtiness as they have below optimal moisture storage for crop uptake in dry summers. These soils are also often slightly limited by topsoil stone content (5-10% hard stones with >20 mm diameter) which can impair precision drilling and reduce the quality of root crops.

Subgrade 3a

- 3.8 This subgrade occurs in a small area of the site with medium loamy topsoils and imperfect drainage (Soil Wetness Class III). Under the local climate this combination results in wetness/workability limitation, which restricts access for field operations in winter and early spring, although late spring (as well as autumn) sowings are usually possible.
- 3.9 Also included is land with sandy subsoil directly below the topsoil which is limited by droughtiness, as the subsoils store insufficient moisture for crop uptake in dry summers and average yields are likely to be adversely affected.

Other land (non-agricultural)

- 3.10 This comprises an access track and equestrian arena.

Grade areas

- 3.11 The land grade is shown on Map 2 and the area occupied is shown below.

Table 1: Areas occupied by the different land grades (ha)

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 2	12.5	77
Subgrade 3a	3.4	20
Other land	0.4	3
Total	16.3	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS
SELECTED DROUGHTINESS CALCULATIONS

Land off Barlestone Road, Newbold Verdon: Soils and ALC survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-30	SCL	5-10	30-70	MSL mod st	xx	70+	Stopped on stone		2	I	2	D/St
2	0-30	SCL	5-10	30-60	SCL sl st	xxx	60-110+	Cr	xxx	0	III	3a	W
3	0-40	SCL	5-10	40-57	MSL	x	57-100+	LMS	xxx	0	I	2	D/St
4	0-28	SCL	5-10	28-65+	SCL mod st	x	65+	Stopped on stone		0	I	2	St
5	0-31	SCL	5-10	31-54	SCL	xxx	54-100+	SCL	xxx	1	II	2	W/St
6	0-32	SCL	5-10	32-50+	SCL/MSLr	x	50+	Stopped on stone		0	I	2	D/St
7	0-30	SCL	5-10	30-45+	CSL grav.	xx	45+	Stopped on gravel		0	I	2	D/St
8	Not recorded												
9	0-35	SCL	5-10	33-70	SCL sl st	xxx	70-100+	MSL mod st	xxx	0	I	2	D/St
10	0-31	SCL	5-10	31-59	SCL	x	59-100+	LMS mod st	x	0	I	2	D/St
11	0-30	SCL	<5	30-80	SCL	o				1	II	2	W
12	0-34	SCL	5-10	34-95+	MSL gravelly	xx				1	I	2	D/St
13	0-30	SCL	<5	30-100+	LMS	xxx				1	I	3a	D
14	0-33	MSL/SCL	5-10	33-50+	MSL mod st	xx	50+	Stopped on stone		0	I	2	D/St
15	0-30	SCL	5-10	30-100+	SCL sl st	xxx				0	II	2	W/St

Soil log key

Gley indicators¹

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common root mottles (topsoils)) ³
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix (gleyed horizon) or reddish matrix and >2% greyish, brownish or ochreous mottles and pale ped faces
xxxx	mottles or f-m concentrations (gleyed horizon) dominantly blueish matrix, often with some reddish mottles (gleyed horizon)

Slowly permeable layers⁴

a depth underlined (e.g. 50) indicates the top of a slowly permeable layer

A wavy underline (e.g. 50) indicates the top of a layer borderline to slowly permeable

Texture²

C	clay
ZC	silty clay
SC	sandy clay
CL	clay loam (H-heavy, M-medium)
ZCL	silty clay loam (H-heavy, M-medium)
SZL	sandy silt loam (F-fine, M-medium, C-coarse)
LS	loamy sand (F-fine, M-medium, C-coarse)
SL	sandy loam (F-fine, M-medium, C-coarse)
S	sand (F-fine, M-medium, C-coarse)
SCL	sandy clay loam
P	peat (H-humified, SF-semi-fibrous, F-fibrous)
LP	loamy peat; PL - peaty loam

Wetness Class⁵

I (freely drained) to VI (very poorly drained)

Limitations:

W	wetness/workability
D	droughtiness
De	depth
F	flooding
St	stoniness
G	gradient
T	topography/microrelief
C	Climate

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)**st** – (very slightly, slightly, moderately, very, extremely) **stony**⁶

(vsl, sl, m, v, x)**ca**
(very slightly, slightly, moderately, very, extremely) **calcareous**⁷

Other abbreviations

fmn	ferri-manganiferous concentrations
dist	disturbed soil layer; chky - chalky
R	bedrock (CH – chalk, SST – sandstone)
LST	limestone, MST – Mudstone)
r	reddish, gn – greenish

¹Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5

²Texture in accordance with particle size classes in Hodgson (1997)

³ Occasionally recorded in the texture box

⁴Permeability is estimated for auger borings and must be confirmed by full pit observations in accordance with the definitions in: Revised Guidelines for grading the quality of Agricultural Land (Maff 1988)

⁵Soil Wetness Classes are defined in Hodgson (1997)

⁶stoniness classes as defined in Hodgson (1997)

⁷calcareous classes as defined in Hodgson (1997)

Grades shown as intergrade e.g. **3a/3b** are close to the grade boundary. The estimate of which side of the boundary the grading falls is the shown first (in bold here) grades in brackets eg. (3a) raised by one grade due to calcareous topsoil

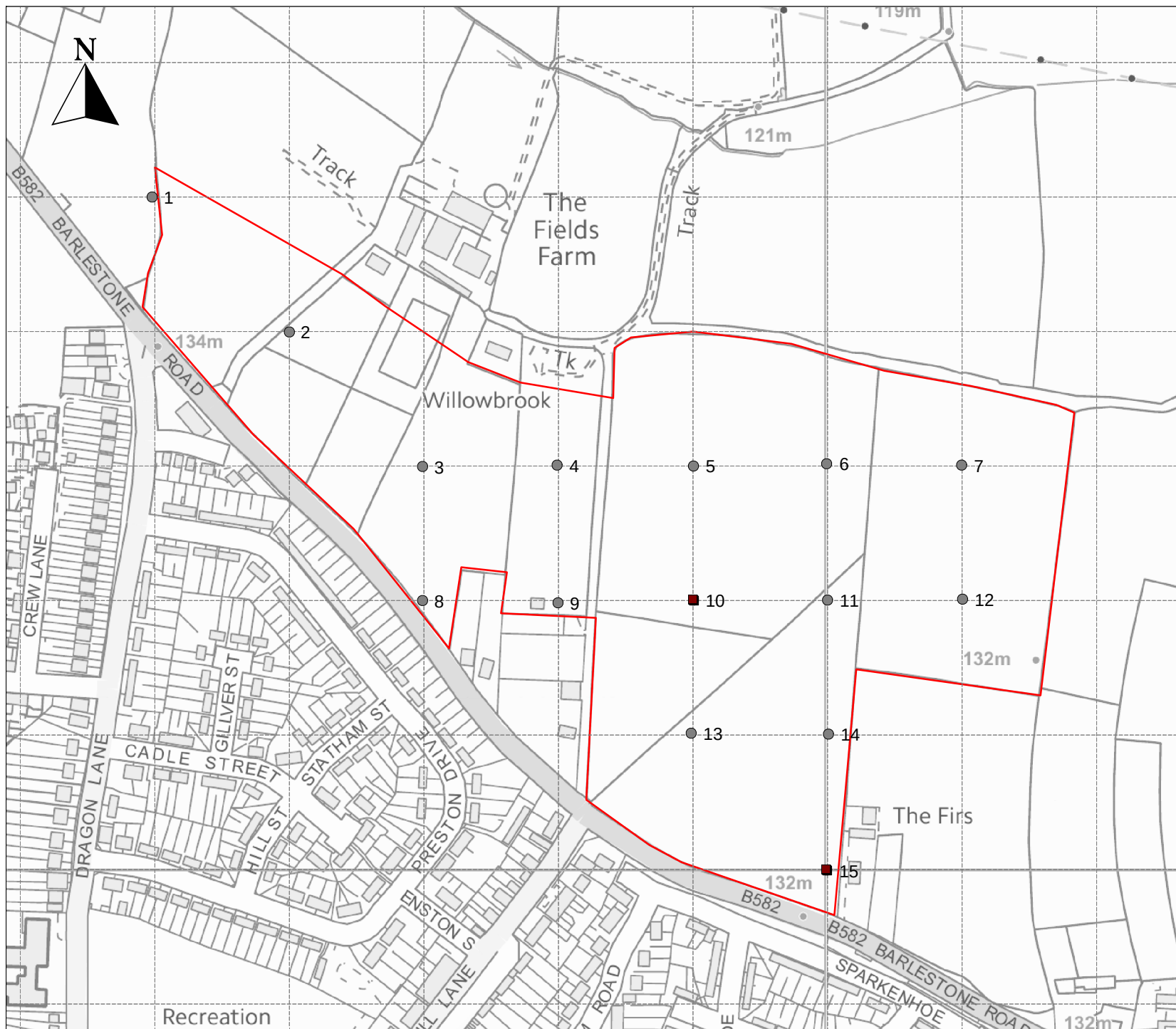
Soil pit descriptions

Pit 10 (see Map 1)

0-31 cm	Dark brown (7.5YR 3/2) sandy clay loam; slightly stony with 10% small and medium rounded hard pebbles; moderately developed medium subangular blocky structure; friable; 2-5% fine pores; common very fine fibrous roots; smooth clear boundary to:
31-59 cm	Brown (7.5YR 5/3) sandy clay loam with 1% diffuse medium yellowish red (5YR 5/8) mottles; well developed fine subangular blocky structure; friable; porous; 10-15% hard rounded pebbles; smooth diffuse boundary to:
59-100 cm+	Light reddish brown (5YR 6/4) loamy medium sand; 10% rounded hard medium and large pebbles; weakly developed fine angular blocky structure; very friable (loose).

Pit 15 (see Map 1)

0-30 cm	Dark brown (7.5YR 3/2) sandy clay loam; 5-10% small and medium rounded hard pebbles; well developed fine subangular blocky structure; very friable; many very fine fibrous roots; 2-5% fine pores; smooth clear boundary to:
30-100 cm+	Brown (7.5YR 5/3) sandy clay loam with 10% large distinct reddish yellow (7.5YR 6/8) and yellow (10YR 7/8) mottles; moderately developed medium to coarse subangular blocky structure; friable; 10-5% medium hard rounded pebbles; porous.



KEY

● Auger observation

■ Soil/land grade description pit

□ Survey area

Site:

**Land off Barlestone Road,
Newbold Verdon**

Map title:

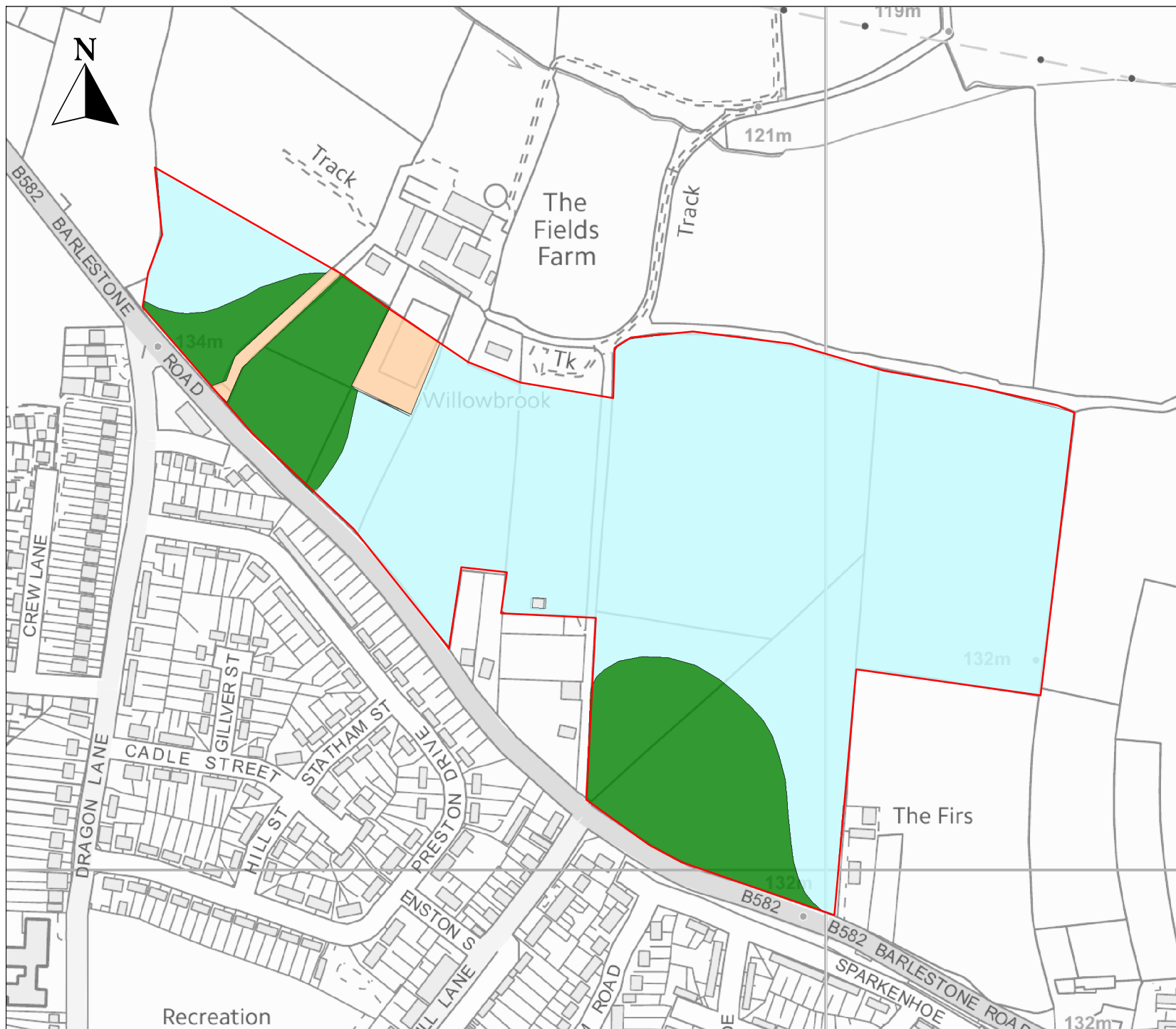
**Map 1
Survey observations**

**Land
Research
ASSOCIATES**

Land Research
Associates Tapton Park
Innovation Centre,
Chesterfield,
S41 0TZ

Scale: 1:5,000

Date: 24/12/2022



KEY

-  Grade 2
-  Subgrade 3a
-  Non agricultural
-  Survey area

Site:

**Land off Barlestone Road,
Newbold Verdon**

Map title:

**Map 2
Agricultural Land Classification**

**Land
Research
ASSOCIATES**

Land Research
Associates Tapton Park
Innovation Centre,
Chesterfield,
S41 0TZ

Scale: 1:5,000

Date: 24/12/2022

SITE:

NV

Location:

10

Layer	Lower depth	Texture symbol	Structure	% stones	Stone type
	(cm)	(or stop)	Good, Moderate or Poor)		(see table)
Topsoil	31	scl		10	1
Subsoil 1	59	scl	g	15	1
Subsoil 2	120	lms	m	10	1
Subsoil 3	120	stop	m	10	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	<i>Fine earth</i>	<i>Stones</i>
Topsoil Av	17	1
Subsoil 1 TAv	19	1
Subsoil 1 EAv	14	0.5
Subsoil 2 TAv	9	1
Subsoil 2 EAv	6	0.5
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5
(ERR = no data)		

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

PROFILE CALCULATIONS

	<i>Ap potatoes</i>	<i>Ap wheat</i>
Topsoil	477.4	477.4
Subsoil 1	0.0	0.0
Subsoil 1	456.4	417.5
Subsoil 2	90.2	0.0
Subsoil 2	0.0	332.5
Subsoil 3	0.0	0.0

TOTAL AP (mm)	102	123
MD (mm)	82	95
AP-MD (mm)	20	28

AGRICULTURAL LAND GRADE

Class	Potatoes	Wheat
1	*	
2		*
3a		
3b		
4		

SITE:

NV

Location:

13

Layer	Lower depth	Texture symbol	Structure	% stones	Stone type
	(cm)	(or stop)	Good, Moderate or Poor)		(see table)
Topsoil	30	scl		10	1
Subsoil 1	120	lms	m	20	1
Subsoil 2	120	stop	m	20	1
Subsoil 3	120	stop	m	20	1

(Lowest horizon depth must be 120 and topsoil cannot be greater than 70 cm (potatoes) or 50 cm (wheat))

DATA USED FROM MASTER TABLE

	Fine earth	Stones
Topsoil Av	17	1
Subsoil 1 TAv	9	1
Subsoil 1 EAv	6	0.5
Subsoil 2 TAv	0.1	1
Subsoil 2 EAv	0.1	0.5
Subsoil 3 TAv	0.1	1
Subsoil 3 EAv	0.1	0.5
(ERR = no data)		

Stone codes	
0	No stones
1	Hard rocks or stones
2	Soft, medium or coarse grained sdst
3	Soft weathered ign or metamorph
4	Soft oolitic or dolomitic limestones
5	Soft fine-grained sandstone
6	Soft argillaceous or silty
7	Chalk
8	Gravel with non-porous stones
9	Gravel with porous stones

PROFILE CALCULATIONS

	Ap potatoes	Ap wheat
Topsoil	462.0	462.0
Subsoil 1	296.0	491.0
Subsoil 1	0.0	0.0
Subsoil 2	0.0	0.0
Subsoil 2	0.0	0.0
Subsoil 3	0.0	0.0

TOTAL AP (mm)	76	95
MD (mm)	82	95
AP-MD (mm)	-6	0

AGRICULTURAL LAND GRADE

Class	Potatoes	Wheat
1		
2	*	
3a		*
3b		
4		