

**AGRICULTURAL QUALITY
OF LAND OFF HEATH ROAD
BAGWORTH**

Report 2164/2

9th April, 2024

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**AGRICULTURAL QUALITY
OF LAND OFF HEATH ROAD, BAGWORTH**

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Report 2164/2
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SUMMARY

An agricultural land quality survey has been undertaken of 26.5 ha of land off Heath Road, Bagworth in July 2023 and April 2024.

The land has dominantly heavy soils over dense reddish clay, with a smaller area of deep permeable loams. The land is mainly of Subgrade 3b agricultural quality limited by wetness and workability constraints, with a minor area of Subgrade 3a land limited by topsoil stone content.

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 26.5 ha of land off Heath Road, Bagworth. The report is based on a survey of the land in July 2023 and April 2024.

SITE ENVIRONMENT

- 1.2 The survey area comprises three large arable fields, bordered to the south by Merrylees Road, to the north by a farm and track off Heath Road and on other sides by adjoining agricultural land.
- 1.3 The land is gently sloping north to south at an average elevation of approximately 140 m AOD.
- 1.4 At the time of survey the land was under wheat.

PUBLISHED INFORMATION

- 1.5 British Geological Survey 1:50,000 scale information records the solid geology as Edwalton Member mudstone overlain by Oadby Member till. An area of sand and gravel is mapped in the southern part of the northern field.
- 1.6 The National Soil Map (published at 1:250,000 scale) records the land to be within the Brockhurst 1 Association: typically slowly permeable seasonally waterlogged reddish fine loamy over clayey soils¹.

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.

2.0 Soils

- 2.1 A soils and agricultural quality survey was carried out in July 2023 in accordance with MAFF (1988) Agricultural Land Classification guidelines². It was based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. During the survey, soils were examined by hand augerings and pits to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

DEEP PERMEABLE LOAMS

- 2.2 These soils occur in the northern field where sand and gravel deposits occur. They typically comprise sandy clay loam topsoil with variable stone content, over a subsoil of the same texture, which grades to a sandy loam at depth. The subsoil is permeable but *gleyed* (pale or greyish colours with ochreous mottles), indicating the soils are naturally affected by shallow groundwater.
- 2.3 An example profile is described from a pit at observation point 25 (see Map 1) in an appendix to this report.

HEAVY SLOWLY PERMEABLE SOILS

- 2.4 These comprise heavy clay loam topsoilss over dense reddish clay subsoil. The subsoils are gleyed (pale coloured ped faces and greyish, brownish or ochreous mottles or ferri-manganiferous concentrations), indicating the soils suffer seasonal waterlogging. In places, a thin permeable upper subsoil occurs. The soils are judged to be imperfectly to poorly-draining (Soil Wetness Class III/IV).
- 2.5 Example profiles are described from pits at observation points 2 and 9 (see Map 1) in an appendix to this report.

²MAFF, (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 Classification³. The relevant site data for a central location at grid reference SK 455 057 and an average elevation of 140 m is given below.

- Average annual rainfall: 699 mm
- January-June accumulated temperature >0°C 1312 day°
- Field capacity period 162 days
(when the soils are fully replete with water) early Nov-mid Apr
- Summer moisture deficits for: wheat: 93 mm
potatoes: 81 mm

3.3 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 MAFF⁴. There are no climatic limitations at this locality.

SURVEY RESULTS

3.4 The agricultural quality of the land is primarily determined by wetness/workability limitations. Other factors have been assessed but do not affect the land grade. Land of grade 3 has been identified.

Subgrade 3a

3.5 This comprises a small area of the northern field with deep loams limited by topsoil stone content (10-15% hard stones with >20 mm diameter). The moderately high topsoil stone content reduces quality of root crops, reduces efficiency of precision drilling and causes increased wear on machinery.

³Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁴MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3b

- 3.6 For the majority of the site the combination of high topsoil clay content and impeded drainage (Soil Wetness Class III/IV) causes wetness/workability limitations. This means that spring access with machinery is rarely possible and arable cropping is therefore mainly limited to autumn sowings as a result.

Non agricultural

- 3.7 This comprises a muck heap, hardstanding and hardcore track.

Grade areas

- 3.8 The land grades are shown on Map 2 and the areas occupied are shown below.

Table 1: Areas occupied by the different land grades

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Subgrade 3a	1.7	6
Subgrade 3b	24.6	93
Non agricultural	0.2	1
Total	26.5	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land off Heath Road, Bagworth: 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 >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-30	HCL	5-10	30-40	HCL	xxx	40+	Stopped on stone		0	-	-	-
2	0-30	HCL	5-10	30-34	HCL	xxx	<u>34</u> -100+	Cr	xxx	0	IV	3b	W
3	0-28	HCL	5-10	28-50	HCL	xxx	<u>50</u> -100+	Cr	xxx	0	III	3b	W
4	0-30	HCL	5-10	<u>30</u> -100+	Cr	xxx				2	IV	3b	W
5	Not recorded - Hedge												
6	0-28	MCL	5-10	<u>28</u> -100+	Cr	xxx				5	IV	3b	W
7	0-28	HCL	5-10	<u>28</u> -60+	Cr	xxx				4	IV	3b	W
8	0-29	HCL	5-10	<u>29</u> -90+	Cr	xxx				2	IV	3b	W
9	0-30	HCL	5-10	<u>30</u> -55	Cr	xxx	<u>55</u> -120	Cr	xxx	3	IV	3b	W
10	0-28	HCL	5-10	<u>28</u> -100+	Cr	xxx				1	IV	3b	W
11	0-26	HCL	<5	<u>26</u> -51	HCL	xxx	<u>51</u> -100+	Cr	xxx	1	III/IV	3b	W
12	0-30	HCL	5-10	<u>30</u> -90+	Cr	xxx				3	IV	3b	W
13	0-30	H/SCL	5-10	<u>30</u> -60+	Cr	xxx				1	IV	3b	W
14	0-28	HCL	5-10	<u>28</u> -100+	Cr	xxx				5	IV	3b	W
15	0-30	HCL	5-10	30-40	HCL	xxx	<u>40</u> -100+	Cr	xxx	2	IV	3b	W
16	0-30	HCL	5-10	<u>30</u> -50	Cr	xxx	50+	Stopped on stone		3	IV	3b	W
17	Not recorded – Hedge/ditch												
18	0-29	HCL	5-10	<u>29</u> -100+	C	xxx				3	IV	3b	W
19	0-30	HCL	10-15	<u>30</u> -100+	C	xxx				2	IV	3b	W
20	Hardstanding												
21	0-27	HCL	5-10	<u>27</u> -35	H/SCL	xxx	35+	Disturbed (next to pond)		2	-	-	-
22	0-30	HCL	10-15	<u>30</u> -95+	C	xxx				1	IV	3b	W
23	0-30	HCL	10-15	<u>30</u> -100+	C	xxx				1	IV	3b	W
24	0-30	HCL	5-10	<u>30</u> -56	HCL	xxx	<u>56</u> -100+	C	xxx	2	III	3b	W
25	0-28	SCL	10-15	28-68	SCL	xxx	68-100+	CSL	xxx	2	II	3a	St
26	0-33	HCL	5-10	<u>33</u> -90+	C	xxx				2	IV	3b	W

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 ochreous 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
SI	slope
T	topography/microrelief
C	Climate
Te	sandy topsoil texture

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)st – (very slightly, slightly,
moderately, very, extremely) stony⁶

(vsl, sl, m, v, x) ca
(very slightly, slightly,
moderately, very, extremely) calcareous⁷

Other abbreviations

fmn	ferri-manganiferous concentrations
dist	disturbed soil layer;
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 in brackets are the current gradings for restored soils

Soil pit descriptions

Pit 2

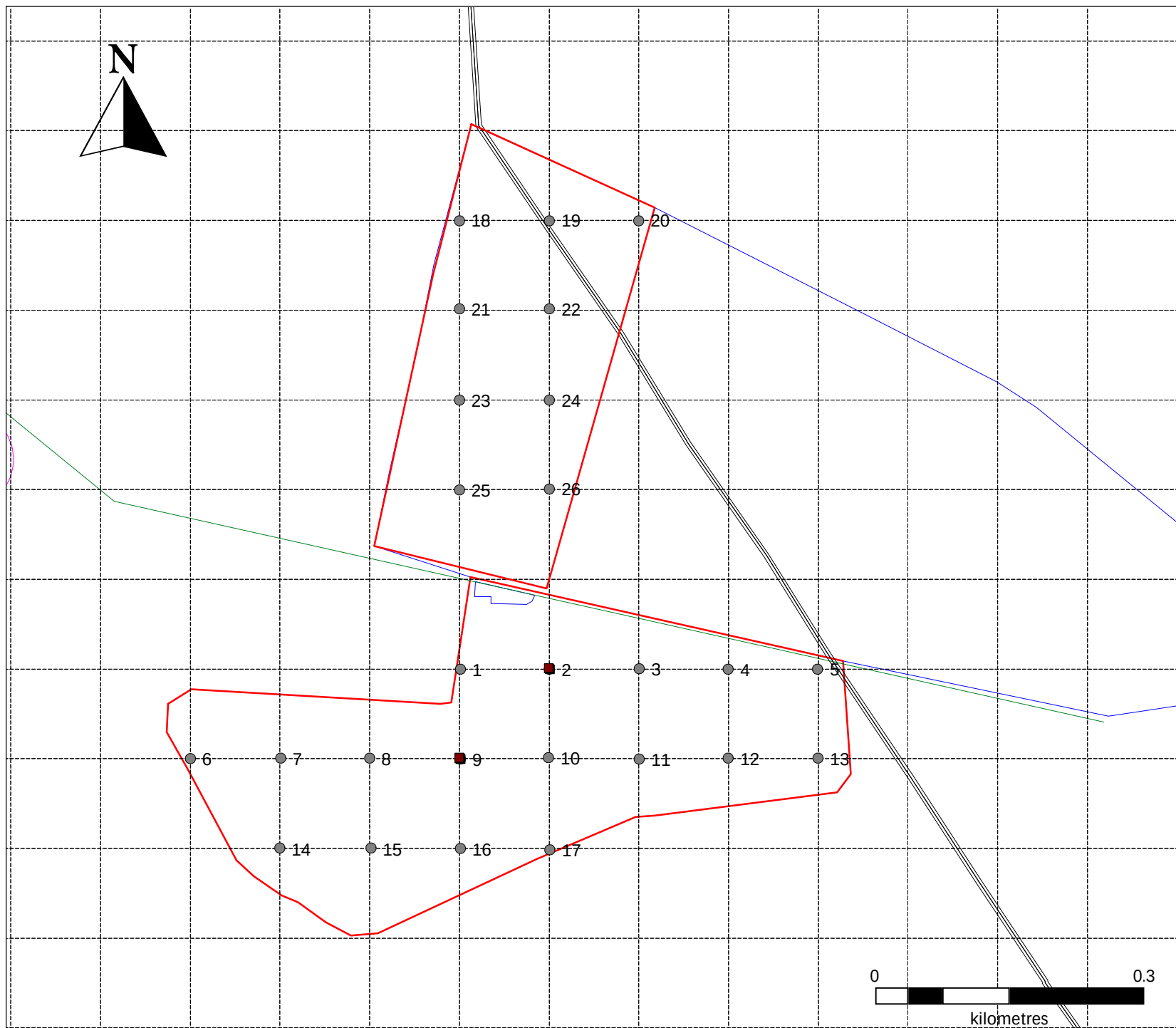
0-30 cm	Brown (7.5YR 4/2) heavy clay loam with 5-10% medium and large mixed pebbles (<5% >20 mm); moderately developed coarse subangular blocky structure; friable; 2-5% fine pores; smooth clear boundary to:
30-34 cm	Brown (7.5YR 5/2) clay with 10% fine strong brown (7.5YR 5/8) and grey (7.5YR 6/1) mottles; slightly stony; weakly developed coarse angular blocky structure; very firm; <0.5% macropores; uneven diffuse boundary to:
34-100 cm+	Reddish brown (5YR 4/4) clay with 10% medium yellowish red (5YR 5/8) mottles and reddish grey (5YR 5/2) ped faces and 2% fine very dark grey (5YR 3/1) ferri-manganiferous concentrations; weakly developed very coarse prismatic structure; very firm; <0.5% macropores.

Pit 9

0-30 cm	Dark brown (7.5YR 3/2) heavy clay loam with 10% medium and large mixed pebbles (<5% >20 mm); moderately developed coarse subangular blocky structure; friable; 2% fine pores; smooth clear boundary to:
30-50 cm	Brown (7.5YR 5/2) clay with 10% fine strong brown (7.5YR 5/8) and grey (7.5YR 6/1) mottles; slightly stony; weakly developed coarse angular blocky structure; very firm; <0.5% macropores; uneven diffuse boundary to:
50-120 cm+	Red (2.5YR 4/6) clay with 10% medium yellowish red (5YR 5/8) mottles and reddish grey (5YR 5/2) ped faces and 2% fine very dark grey (5YR 3/1) ferri-manganiferous concentrations; weakly developed very coarse prismatic structure; very firm; <0.5% macropores.

Pit 25

0-28 cm	Brown (7.5YR 4/2) sandy clay loam with 10-15% medium rounded mixed pebbles; moderately developed medium subangular blocky structure; friable; 1% fine pores; smooth clear boundary to:
28-68 cm	Brown (7.5YR 5/4) sandy clay loam with 10% fine reddish yellow (7.5YR 6/6) mottles; 10% hard mixed stones; moderately developed medium subangular blocky structure; friable; poreous; smooth diffuse boundary to:
50-120 cm+	Reddish brown (5YR 5/3) coarse sandy loam with large yellowish red (5YR 5/8) mottles and black (5YR 2.5/1) ferrimanganiferous concentrations; slightly stony; weakly developed angular blocky structure; friable; porous.



KEY

● Auger observation

■ Soil/land grade description pit

□ Survey area

Site:

**Land off Heath Road,
Bagworth**

Map title:

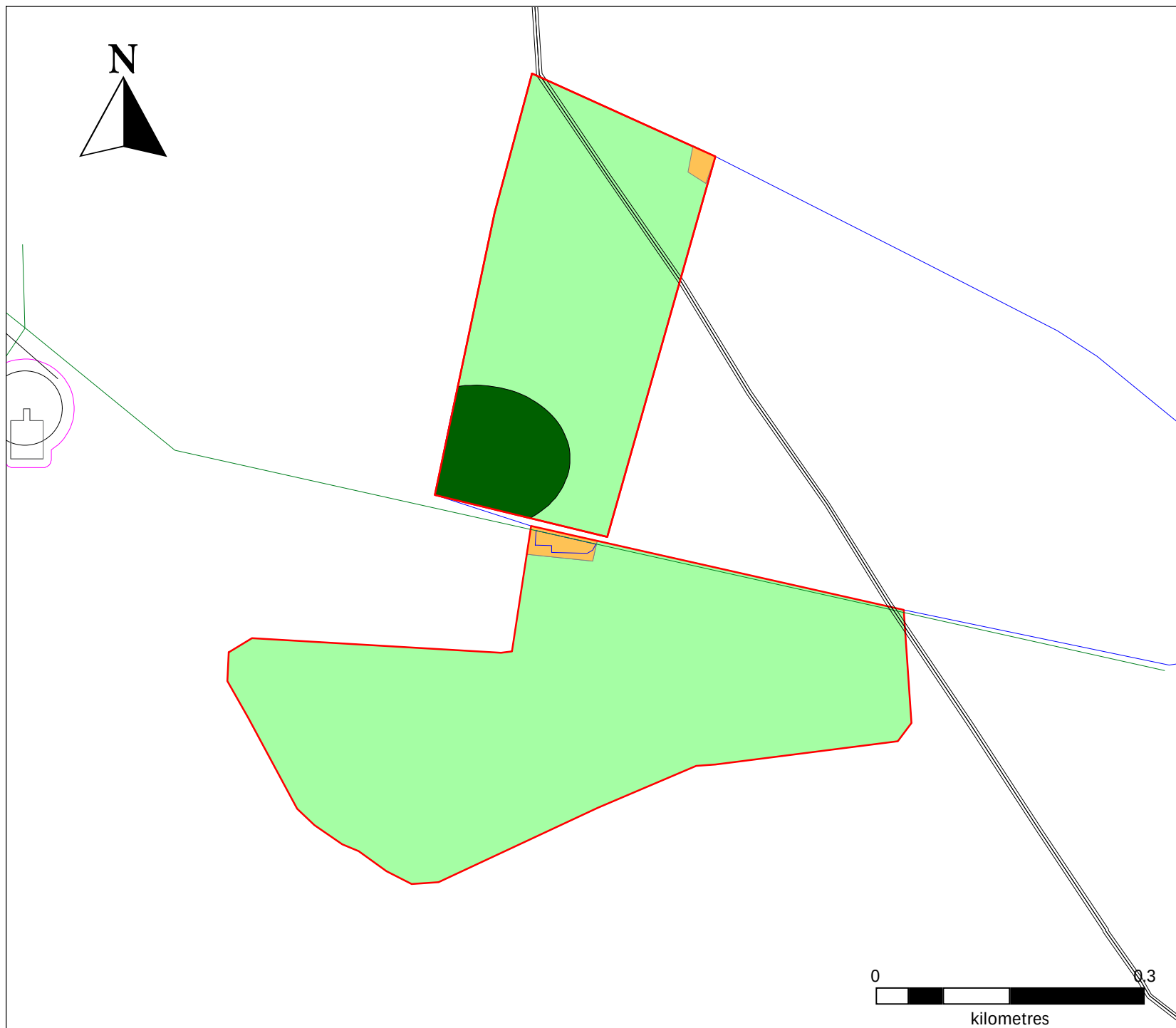
**Map 1
Survey observations**

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www.lra.co.uk

Scale: 1:6,000

Date: 09/04/2024



KEY

-  Subgrade 3a
-  Subgrade 3b
-  Non agricultural
-  Survey area

Site:

**Land off Heath Road,
Bagworth**

Map title:

**Map 2
Agricultural Land Classification**

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