

**AGRICULTURAL QUALITY OF LAND
WEST OF GLOUCESTER ROAD
HARESFIELD**

Report 1689/2

18th May, 2020

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HARESFIELD**

L Thomas, MSc

Report 1689/2
Land Research Associates Ltd
Lockington Hall,
Lockington,
Derby
DE74 2RH
www.lra.co.uk

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SUMMARY

An agricultural land quality survey has been undertaken of 23.0 ha of land west of Gloucester Road, Haresfield.

There are two main soil types within this site: fine loamy over slowly permeable soils in the north, giving subgrade 3b quality land; and loamy soils over limestone gravel in the south providing grade 2 quality land. Agricultural land quality of the sites is limited by wetness (subgrade 3b land) or droughtiness (grade 2 land).

1.0 Introduction

- 1.1 This report provides information on the agricultural quality of 23 ha of land off Gloucester Road, Haresfield. The report is based on the findings of a detailed survey of the site in May 2020.

SITE ENVIRONMENT

- 1.2 The site comprises two agricultural fields, bordered to the north by Javelin Park, to the west by the M5, to the south by adjoining agricultural land and to the east by Gloucester Road.
- 1.3 The land is level to very gently sloping, with an average elevation of approximately 25 m AOD.

PUBLISHED INFORMATION

- 1.4 1:50,000 scale BGS information records the geology of the land as undifferentiated Blue Lias Formation and Charmouth Mudstone Formation. Superficial deposits of Cheltenham Sand and Gravel are recorded to overlie the basal geology of land in the south of the site.
- 1.5 A reconnaissance detail soil map of the area (published at 1:250,000 scale) shows the land within the sites as predominantly Evesham 2 Association, mainly slowly permeable calcareous clayey soils. Land in the south of the site is mapped as Badsey 2 Association: these are typically well drained calcareous fine loamy soils over limestone gravel¹.
- 1.6 Reconnaissance detail Agricultural Land Classification (ALC) mapping shows the land as grade 3 quality. No detailed survey of the land has previously been published.

¹Findlay, D.C. *et al.*, (1984). *Soils and their use in South West England*, Soil Survey of England and Wales. Bulletin No. 14, Harpenden.

2.0 Soils

2.1 A detailed soil resource and agricultural quality survey was carried out in May 2020. It was based on observations at intersects of a 100 m grid, giving a sampling density of one observation per hectare. During the survey, soils were examined by a combination of pits and augerings to a maximum depth of 1.0 m. A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

2.2 Two main soil types were found across the site, they are described below.

LOAMY SOILS OVER LIMESTONE GRAVEL

2.3 These soils are formed on the sand and gravel deposits recorded in the south of the site. They comprise mainly sandy clay loam topsoil and upper subsoil over a limestone gravel lower subsoil. The soils are permeable and show no signs of seasonal waterlogging.

2.4 An example profile is described below from a pit at observation 20 (Map 1).

0-30 cm	Brown (10YR 4/3) sandy clay loam; slightly stony with small subangular hard stones; well developed fine subangular blocky structure; very friable; smooth clear boundary to:
30-53 cm	Yellowish brown (10YR 5/4) sandy clay loam with few fine faint reddish yellow (7.5 YR 6/6) mottles; very slightly stony with small and medium subangular hard stones; moderately developed fine subangular blocky structure; friable; smooth sharp boundary to:
53-100cm+	Brownish yellow (10YR 6/6) medium sandy loam with common reddish yellow (7.5YR 6/8) mottles; very stony with 40% small angular limestone gravel; weakly developed fine granular structure; friable; extremely calcareous.

2.5 These soils are freely draining (Soil Wetness Class I), with a high capacity to absorb excess rainfall.

SLOWLY PERMEABLE SOILS

2.6 These soils occur in the north of the site. They comprise mainly heavy clay loam or clay topsoils over slowly permeable clay subsoil that shows evidence of seasonal waterlogging to shallow depth (greyish and ochreous *gley* mottle colouration).

2.7 An example profile is described below from a pit at OS reference SO803108.

0-30 cm	Dark greyish brown (10YR 4/2) heavy clay loam; very slightly stony with small subangular hard stones; moderately developed medium subangular blocky structure; friable; smooth clear boundary to:
30-74 cm	Olive brown (2.5Y 4/4) clay with common distinct fine reddish yellow (7.5YR 6/8) and grey (2.5Y 5/1) mottles; very slightly stony with small subangular hard stones; weakly developed coarse prismatic structure; firm; smooth gradual boundary to:

74-100cm+ Grey (Gley 6 1/N) clay with common medium distinct reddish yellow (7.5YR 6/8) mottles; slightly stony with small rounded chalk stones; massive (structureless); very firm; calcareous.

2.8 These soils are poorly draining (Soil Wetness Class IV), with a low capacity to absorb excess winter rainfall.

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 Classification². The relevant site data for an average elevation of 25 m is given below.

- Average annual rainfall: 737 mm
- January-June accumulated temperature >0°C 1500 day°
- Field capacity period 160 days
(when the soils are fully replete with water) early Nov-mid Apr
- Summer moisture deficits for: wheat: 106 mm
potatoes: 99 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 MAFF³. There are no climatic limitations at this locality.

SURVEY RESULTS

3.4 The agricultural quality of the land is determined by wetness or droughtiness. Land of grades 2 and 3 has been identified.

Grade 2

3.5 This land grade comprises the loamy soils over gravel in the south of the site. The gravelly lower subsoils mean the soils store slightly sub-optimal water reserves; this is likely to reduce yields of cereal crops in dry summers.

²Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

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

Subgrade 3b

3.6 This land grade makes up the land in the north of the site. The land is limited by wetness due to the combination of relatively high topsoil clay content and imperfect to poor subsoil drainage (Soil Wetness Class III/IV). This means the land is likely to be too wet to cultivate in spring most years. Arable use of the land is therefore limited to autumn-sown combinable crops.

Other land (non-agricultural)

3.7 This land comprises hardstanding in the west of the site.

Grade areas

3.8 The boundary of the land grades are shown on Map 2, the areas occupied are shown below.

Table 1: Areas occupied by the land grades

<i>Grade/subgrade</i>	<i>Area (ha)</i>	<i>% of the land</i>
Grade 2	9.2	40
Subgrade 3b	12.4	54
Non Agricultural	1.4	6
Total	23.0	100

APPENDIX

MAPS AND DETAILS OF OBSERVATIONS

Land west of Gloucester Road, Haresfield: ALC survey – Details of observations at each sampling point

Obs No	Topsoil			Upper subsoil			Lower subsoil			Slope (°)	Wetness Class	Agricultural quality	
	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling			Grade	Main limitation
1	0-30	HCL	<5	30-60	HCL ca	xxx	60-100+	HCL	xxx	0	III	3b	W
2	0-31	HCL	<5	31-100+	C	xxx				0	IV	3b	W
3	0-30	HCL	<5	30-45	HCL	xxx	45-80+	C	xxx	1	III/IV	3b	W
4	0-28	HCL	<5	28-41	HCL	xxx	41-60+	C	xxx	0	IV	3b	W
5	0-31	HCL	<5	31-95	C	xxx				0	IV	3b	W
6	0-28	HCL dist	5-10	28+	Stopped on stone – former airfield					0	IV	3b	W
7	0-32	HCL	<5	32-60+	C	xxx				0	IV	3b	W
8	0-31	HCL dist	10-15	31-37	C v stony	xxx	37+	Stopped on stone – former airfield		1	IV	3b	W
9	0-29	SCL	<5	29-46	SCL	x	46-73 73-100	MSL MSL grav.	o xx	0	I	3a	D
10	0-30	HCL/SCL	<5	30-80+	C	xxx				1	IV	3b	W
11	0-28	HCL	<5	28-100+	C	xxx				1	IV	3b	W
12	Non agricultural – hard standing												
13	0-29	SCL	<5	29-60	SCL	o	60-80 80-100+	SCL MSL ca grav.	xxx	0	I	2	D
14	0-31	SCL	<5	31-81	C	xxx	81-100+	SCL	xxx	0	IV	3b	W
15	0-30	HCL ca dist	10-15	30+	Stopped on stone – former airfield					0	IV	3b	W
16	0-31	SCL	<5	31-60	SCL	o	60-80+	MSL grav.	x	0	I	2	D
17	0-30	HCL ca	<5	30-60	C	xxx				1	IV	3b	W
18	Non agricultural - hard standing												
19	Not surveyed – hedgerow												
20	0-30	SCL	<5	30-53	SCL	o	53-100+	MSL ca grav.	xx	0	I	2	D
21	0-30	SCL	<5	30-48	SCL	o	48-81 81-100+	SCL ca MSL ca grav.	o xxx	0	I	2	D
22	0-30	SCL	<5	30-62	SCL	o	62-100+	HCL	xx	0	I	2	D
23	0-28	MCL	<5	28-71	HCL	o	71-100+	CSL grav. Ca	xx	0	I	2	D
24	0-29	HCL	<5	29-58	HCL	x	58-100+	HCL	xxx	0	I	2	W

Key to table

Mottle intensity:

- o unmottled
- x few to common rusty root mottles (topsoils)
or a few ochreous mottles (subsoils)
- xx common to many ochreous mottles and/or dull structure faces
- xxx common to many greyish or pale mottles (gleyed horizon)
- xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

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

Texture:

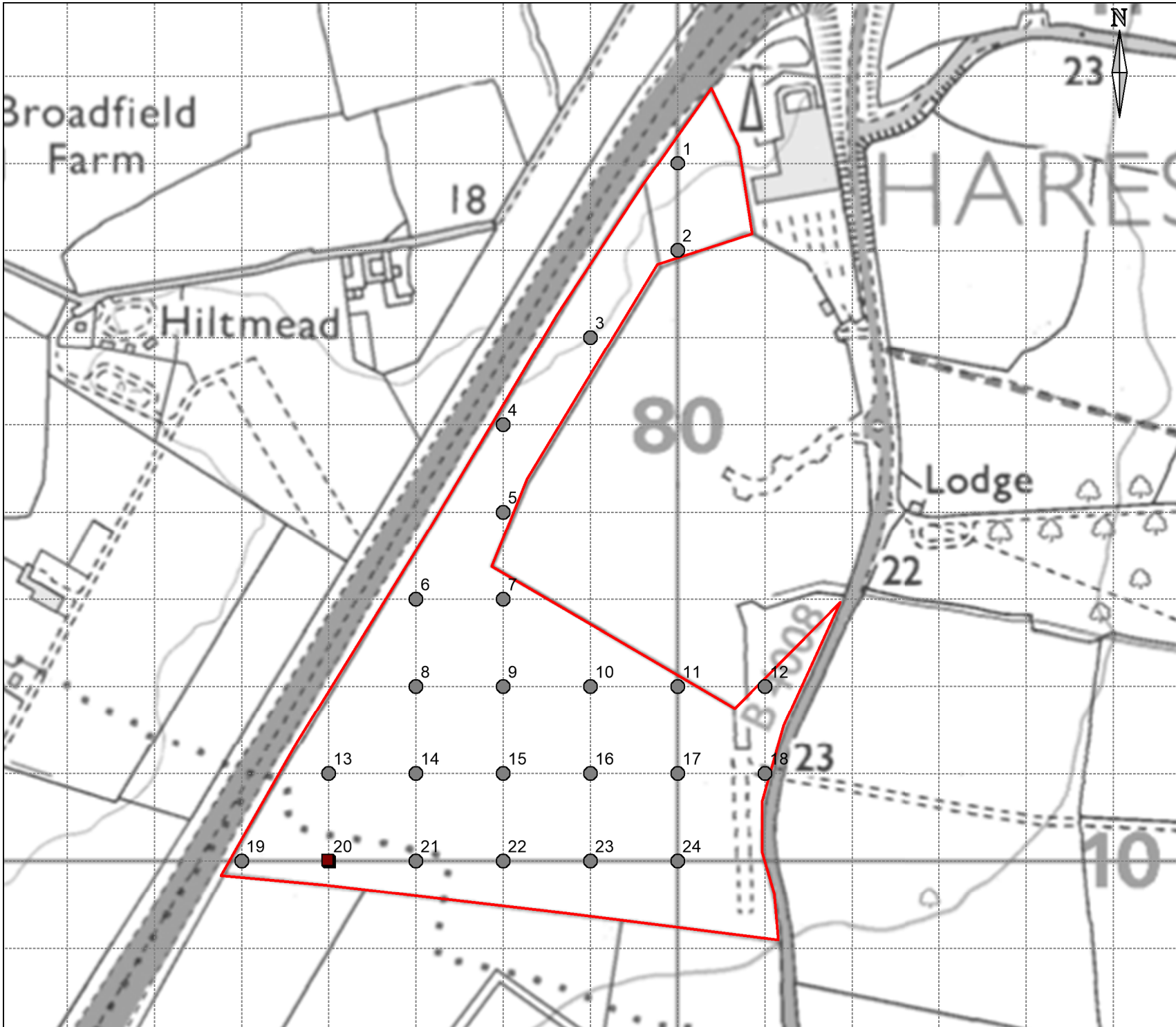
- C - clay
- ZC - silty clay
- SC - sandy clay
- CL - clay loam (H-heavy, M-medium)
- ZCL - silty clay loam (H-heavy, M-medium)
- SCL - sandy clay loam
- SZL - sandy silt loam (F-fine, M-medium, C-coarse)
- SL - sandy loam (F-fine, M-medium, C-coarse)
- LS - loamy sand (F-fine, M-medium, C-coarse)
-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

Limitations:

- W - wetness/workability
- D - droughtiness
- De - depth
- St - stoniness
- SI - slope
- F - flooding
- T - topography/microrelief

Texture suffixes & prefixes:

- ca - calcareous: x-extremely, v-very, sl-slightly
- (ca) marginally calcareous
- mn - ferrimanganiferous concentrations
- gn - greenish, yb - yellowish brown, rb - reddish brown
- r - reddish; (v)st - (very) stony; sdst - sandstone; lst - limestone
- dist - disturbed soil layer; mdst - mudstone



KEY

- Auger observation
- Soil/land grade description pit
- Survey area

Client:



Site:

Land west of Gloucester Road, Haresfield

Map title:

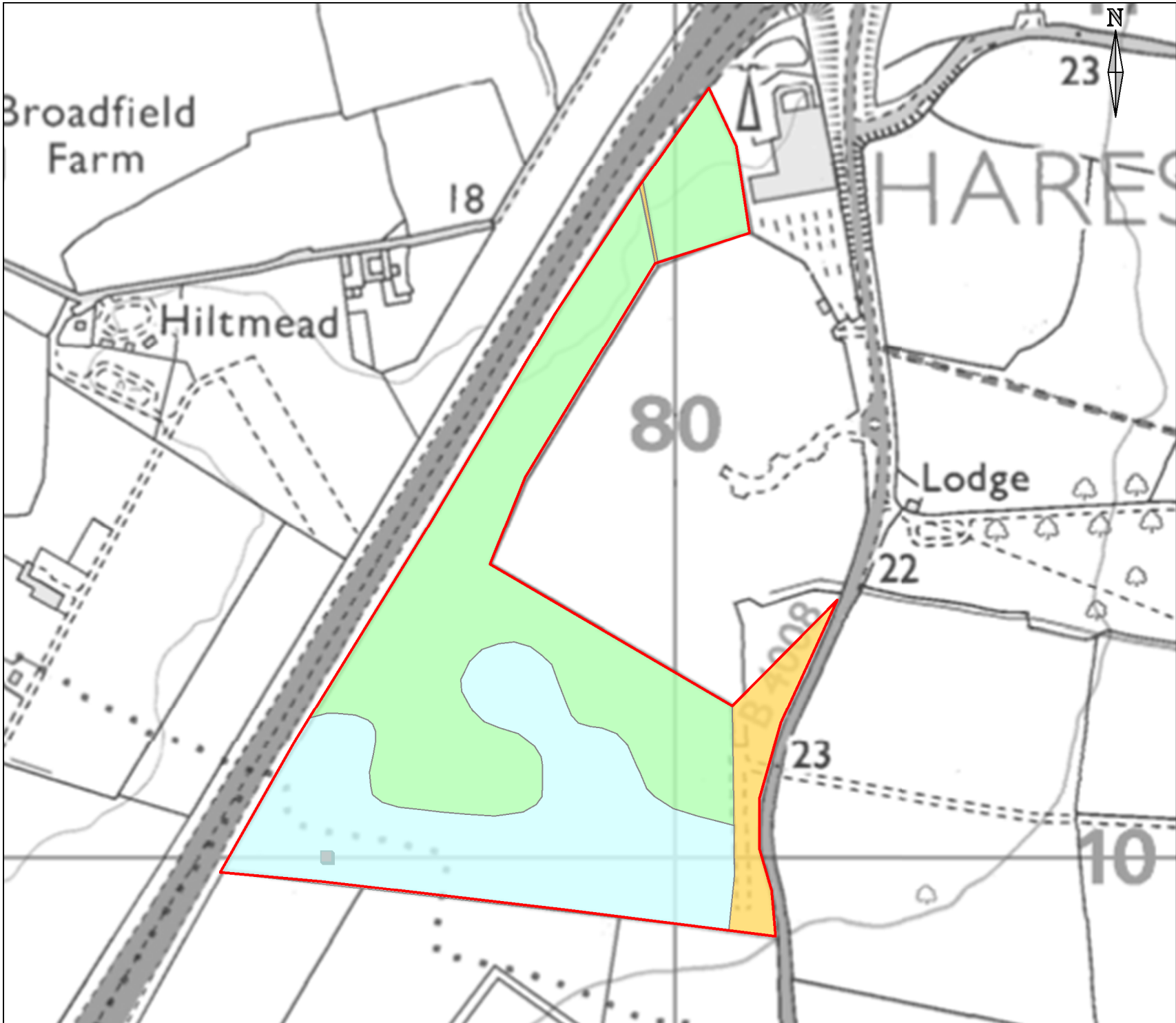
**Map 1
Survey observations**



Land Research Associates
Lockington Hall
Lockington
Derby DE74 2RH
01509 670570

Scale: 1:6,000

Date: 14/03/2019



KEY

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

Client:



Site:

**Land west of Gloucester Road,
Haresfield**

Map title:

**Map 2
Agricultural Land Classification**



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01509 670570

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