AGRICULTURAL QUALITY OF LAND AT EASTBOURNE

Report 2127/1

14th March 2023

Land Research ASSOCIATES
www.lra.co.uk

AGRICULTURAL QUALITY

OF LAND AT EASTBOURNE

R E Leverton PhD, MRSB, FISoilSci

Report 2127/1
Land Research Associates Ltd
Lockington Hall,
Lockington,
Derby
DE74 2RH
www.lra.co.uk

14th March, 2023

SUMMARY

An agricultural land quality survey has been undertaken of 25.3 ha of land at Eastbourne, East Sussex in March 2023.

The land has heavy poorly drained soils. All of the land is limited to Subgrade 3b agricultural quality by wetness/workability.

1.0 Introduction

1.1 This report provides information on the agricultural quality of 25.3 ha of land at Eastbourne, East Sussex. The report is based on a survey of the land in March 2023.

SITE ENVIRONMENT

1.2 The survey area comprises two separate parcels of land: four fields in the west and five fields in the east, each field being bounded by ditches. The two land parcels are separated by a lake, agricultural land and a railway. Land within the site is level to very gently sloping, at an average elevation of approximately 4 m AOD.

1.3 At the time of survey all of the land was under grazing pasture.

PUBLISHED INFORMATION

1.4 British Geological Survey 1:50,000 scale information records the solid geology of the land as Gault Clay. Overlying superficial deposits of alluvium (clay, silt, sand and peat) are also recorded.

1.5 The National Soil Map (published at 1:250,000 scale) records all of the land as Newchurch 2 Association, comprising deep stoneless, mainly calcareous clay soils[1].

[1]Jarvis M.G. *et al*., (1984). Soils and their use in South East England, Soil Survey of England and Wales. Bulletin No. 15, Harpenden.

2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in March 2023 in accordance with MAFF (1988) guidelines[2]. 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 a combination of pits and augerings to a maximum depth of 1.2 m. A log of the sampling points and a map (Map 1) showing their locations are in an appendix to this report.

2.2 A single soil type was found within the whole of the survey area, which comprises a thin heavy silty clay loam or silty clay topsoil, overlying silty clay subsoil. The subsoil is heavily mottled and gleyed (indicating seasonal waterlogging) and comprises a slowly permeable layer; the land is judged to be poorly-draining (Soil Wetness Class IV).

2.3 An example profile from the western land parcel is described below from a pit at observation 7 (Map 1).

0-10 cm	Dark greyish brown (10YR 4/2); heavy silty clay loam; stoneless; moderately developed fine to medium sub-angular blocky structure; friable; non-calcareous; abundant fine fibrous roots; smooth abrupt boundary to:
10-53 cm	Light olive brown and greyish brown (2.5Y 5/3 & 5/2); silty clay; stoneless; moderately developed coarse angular blocky structure; firm; very many prominent ochreous mottles (10YR 5/6); common fine fibrous roots; <0.5% biopores; very slightly calcareous; smooth clear boundary to:
53-100 cm+	Greyish brown (2.5Y 5/2); silty clay; stoneless; weakly developed coarse prismatic structure (adherent); very many prominent ochreous mottles (10YR 5/6); few fine fibrous roots; <0.5% biopores; calcareous.

2.4 An example profile from the eastern land parcel is described below from a pit at observation 24 (Map 1).

0-25 cm	Brown (10YR 4/3); heavy silty clay loam; stoneless; moderately developed medium sub-angular blocky structure; friable; non-calcareous; abundant fine fibrous roots; smooth abrupt boundary to:
25-69 cm	Light olive brown and greyish brown (2.5Y 5/3 & 5/2); silty clay; stoneless; weakly developed very coarse angular blocky structure; firm; very many prominent ochreous mottles (10YR5/6); common fine fibrous roots; <0.5% biopores; very slightly calcareous; smooth clear boundary to:
69-100 cm+	Greyish brown (2.5Y 5/2); silty clay; stoneless; weakly developed coarse prismatic structure (adherent); very many prominent ochreous mottles (10YR 5/6); few fine fibrous roots; <0.5% biopores; calcareous.

[2]MAFF, (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. This report describes the main limitations affecting ALC grades at this site. Other factors (e.g. droughtiness, flooding, micro-relief etc.) were assessed but did not affect the overall grading of the site.

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 Classification[3]. The relevant site data for an average elevation of 4 m AOD is given below for the western and eastern areas respectively.

West

• Average annual rainfall:	780 mm
• January-June accumulated temperature >0°C	1530 day°
• Field capacity period (when the soils are fully replete with water)	165 days
• Summer moisture deficits for:	wheat: 116 mm potatoes: 112 mm

East

• Average annual rainfall:	780 mm
• January-June accumulated temperature >0°C	1530 day°
• Field capacity period (when the soils are fully replete with water)	165 days
• Summer moisture deficits for:	wheat: 116 mm potatoes: 113 mm

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

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 MAFF[4]. There are no climatic limitations at this locality.

SURVEY RESULTS

3.4 The agricultural quality of the land is determined by a wetness/workability limitation. Land of grade 3 has been identified.

Subgrade 3b

3.5 The whole of the survey area has heavy topsoil and poor drainage. Under the local climate this combination means opportunity for spring access with machinery are rare and arable cropping is therefore mainly limited to autumn-sown sowings.

Grade areas

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

Table 1: Areas occupied by the different land grades

Grade/subgrade	*Area (ha)*	*% of the land*
Subgrade 3b	25.3	100
Total	25.3	100

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

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land at Eastbourne, East Sussex: 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	0-25	HZCL	0	25-90	ZC	xxx	90-120	ZC	xxx	0	IV	3b	W
2	0-23	HZCL	0	23-78	ZC	xxx	78-120	ZC	xxx	0	IV	3b	W
3	0-24	HZCL	0	24-68	ZC	xxx	68-120	ZC	xxx	0	IV	3b	W
4	0-20	HZCL	0	20-65	ZC	xxx	65-120	ZC	xxx	1	IV	3b	W
5	0-18	HZCL	0	18-52	ZC	xxx	52-120	ZC	xxx	0	IV	3b	W
6	0-24	ZC	0	24-72	ZC	xxx	72-120	ZC	xxx	0	IV	3b	W
7	0-10	HZCL	0	10-53	ZC	xxx	53-120	ZC	xxx	0	IV	3b	W
8	0-23	HZCL	0	23-63	ZC	xxx	63-120	ZC	xxx	0	IV	3b	W
9	0-11	HZCL	0	11-30	ZC	xxx	30-68 68-120	ZC ZC	xxx xxx	0	IV	3b	W
10	0-26	ZC	0	26-65	ZC	xxx	65-120	ZC	xxx	0	IV	3b	W
11	0-20	HZCL	0	20-42	ZC	xxx	42-65 65-120	ZC ZC	xxx xxx	0	IV	3b	W
12	0-10	HZCL	0	10-50	ZC	xxx	50-120	ZC	xxx	0	IV	3b	W
13	0-25	ZC	0	25-120	ZC	xxx				0	IV	3b	W
14	0-20	HZCL	0	20-100	ZC	xxx	100-120	ZC	xxx	0	IV	3b	W
15	0-25	ZC	0	25-120	ZC	xxx				0	IV	3b	W
16	0-27	HZCL	0	27-73	ZC	xxx	73-120	ZC	xxx	0	IV	3b	W
17	0-33	ZC	0	33-70	ZC	xxx	70-120	ZC	xxx	0	IV	3b	W
18	0-11	HZCL	0	11-74	ZC	xxx	74-120	ZC	xxx	0	IV	3b	W
19	0-25	HZCL	0	25-75	ZC	xxx	75-120	ZC	xxx	0	IV	3b	W
20	0-20	HZCL/ZC	0	20-78	ZC	xxx	78-120	ZC	xxx	0	IV	3b	W
21	0-10	HZCL	0	10-70	ZC	xxx	70-120	ZC	xxx	0	IV	3b	W
22	0-20	ZC	0	20-35	ZC	xxx	35-67 67-120	ZC ZC	xxx xxx	0	IV	3b	W
23	0-20	HZCL	0	20-77	ZC	xxx	77-120	ZC	xxx	0	IV	3b	W
24	0-25	HZCL	0	25-69	ZC	xxx	69-120	ZC	xxx	0	IV	3b	W
25	0-27	ZC	0	27-60	ZC	xxx	60-120	ZC	xxx	0	IV	3b	W

Survey log key

Gley indicators[1]

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 mottles or f-m concentrations (gleyed horizon)
xxxx	dominantly blueish matrix often with some ochreous mottles (gleyed horizon)

Slowly permeable layers[4]

a depth underlined (e.g. <u>50</u>) indicates

the top of a slowly permeable layer

A wavy underline (e.g. <u>50</u> indicates

the top of a layer borderline to slowly permeable

Texture[2]

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 Class[5]

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

Limitations:

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

Suffixes & prefixes:

r-reddish, gn – greenish
o - organic
(m, v, x)**st** –(moderately, very, extremely)**stony**

(vsl, sl, m, v, x)**ca** (very slightly, slightly, moderately very, extremely)**calcareous**
chky-chalky

Other abbreviations

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

[1]Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5
[2]Texture in accordance with particle size classes in Hodgson (1997)
[3] Occasionally recorded in the texture box
[4]Permeability 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)
[5]Soil Wetness Classes are defined in Hodgson (1997)
[6]stoniness classes as defined in Hodgson (1997)
[7]calcareous classes as defined in Hodgson (1997)

KEY

Auger observations

Pits

Site boundary

Site:

Eastbourne

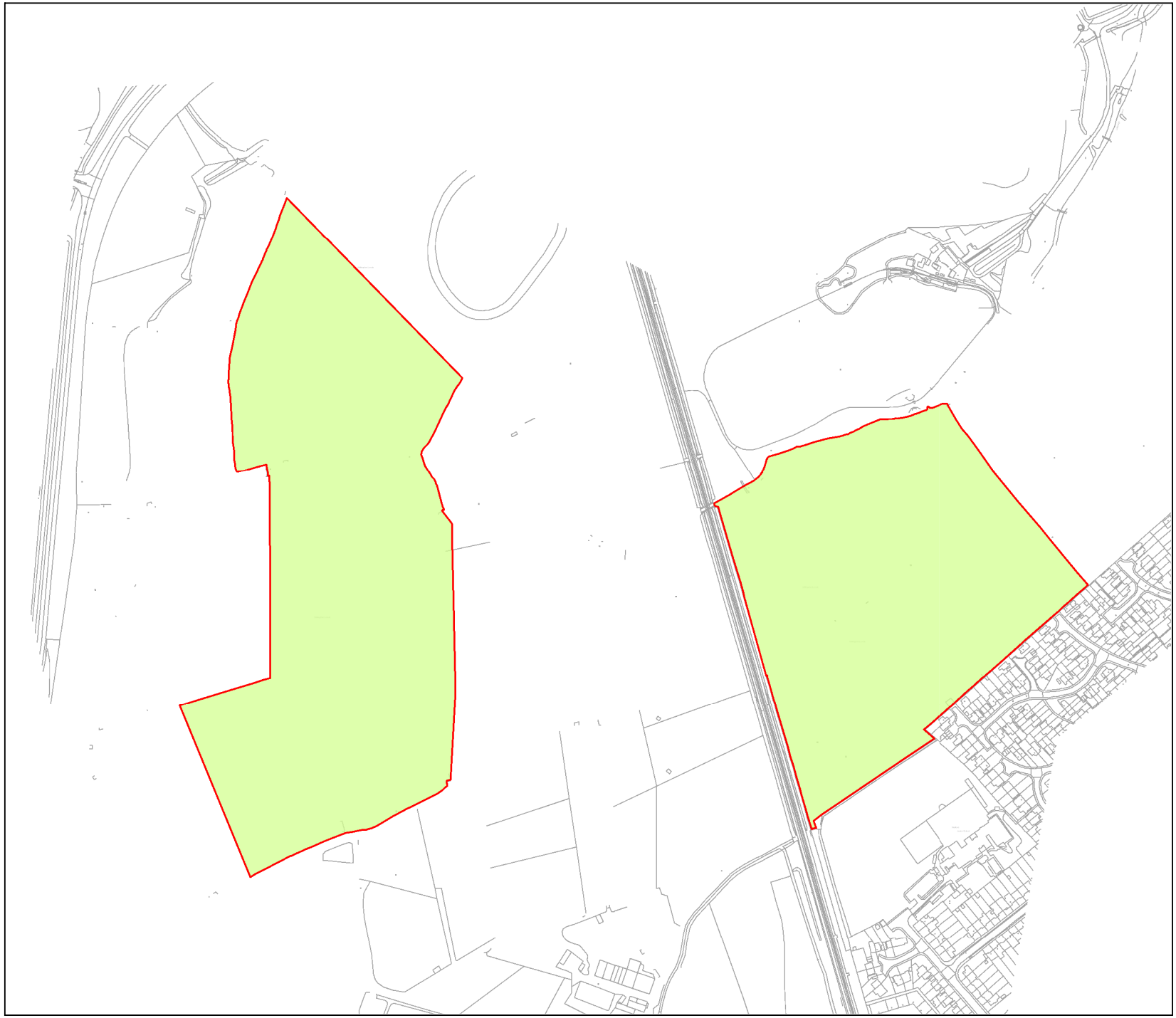
Map title:

MAP 1
Observations

Land Research ASSOCIATES
Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 14/03/2023

Scale: 1:6,000



KEY

Subgrade 3b

Site boundary

Site:

Eastbourne

Map title:

MAP 2
Agricultural Land
Classification

Land Research ASSOCIATES
Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 14/03/2023

Scale: 1:6,000