SOILS AND AGRICULTURAL QUALITY OF LAND EAST OF DOVER ROAD DEAL

Report 1276/1

20th February, 2017

Land Research ASSOCIATES

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OF LAND EAST OF DOVER ROAD, DEAL

M W Palmer, MSc, PhD, MISoilSci

Report 1276/1
Land Research Associates Ltd
Lockington Hall,
Lockington,
Derby
DE74 2RH

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SUMMARY

This report provides information on the soils and agricultural quality of 4.0 ha of land off Dover Road, Deal, Kent. The land is in use as a mixture of woodland and horse paddocks, but retains some agricultural potential.

The soils were found to vary between deep silty clay loams and shallow soils over chalk. The former give land of grade 2 agricultural quality, while the latter give land of subgrade 3a, both limited by droughtiness. Substantial areas of the site are under maturing woodland and this land is considered Non Agricultural due to the impracticality of returning it to production.

Were the site to be developed, the medium loamy topsoils would provide a high quality resource for re-use in landscaping.

1.0 Introduction

1.1 This report provides information on the soils and agricultural quality of 4.0 ha of land east of Dover Road, Deal, Kent. The report is based on a survey of the land in January 2017.

SITE ENVIRONMENT

1.2 The land investigated comprises grass paddocks and woodland. The site is bordered to the north by residential development, to the east by adjoining agricultural land, to the south by residential housing and agricultural land and to the west by Dover Road.

1.3 The land is gently sloping with an average elevation of approximately 41 m AOD.

AGRICULTURAL USE

1.4 The land was in use as horse paddocks and woodland at the time of survey. The land is not registered to any agri-environment schemes.

PUBLISHED INFORMATION

1.5 1:50,000 scale BGS information records the land to be underlain by Sleaford Chalk Formation. Superficial deposits of Head are recorded to overlie the chalk with the exception the south-western corner.

1.6 The National Soil Map (published at 1:250,000 scale) shows the soils at the site to be within the Coombe 1 Association. These soils are mainly well draining, calcareous fine silty loams varying between deeper soils formed in drift and shallow soils over chalk[1].

1.7 Provisional Agricultural Land Classification (ALC) mapping of the site shows the land as grade 3. Post 1988 mapping records the land as predominantly grade 2 with a band of subgrade 3a in the south-west.

[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 The National Planning Practice Guidance states that the planning system should protect and enhance valued soils and prevent the adverse effects of unacceptable levels of pollution. This is because soil is an essential finite resource that provides important ecosystem services, for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution.

2.2 A detailed soil resource and agricultural quality survey was carried out in January 2017. It was based on observations at alternate intersects of a 50 m grid, giving a sampling density of two observations 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.

2.3 The soils were found to vary in depth across the site. The distribution of soil types is shown in Map 2 and they are described below.

DEEP SILTY SOILS

2.4 These soils are found over most of the site and comprise medium or heavy silty clay loam topsoil and upper subsoil, mainly over a heavy silty clay loam subsoil which is moderately to poorly structured, with evidence of slight seasonal waterlogging in some places.

2.5 An example profile is described below from a pit at observation 10 (Map 1).

0-25 cm	Dark greyish brown (10YR 4/2) medium silty clay loam; slightly stony (small hard angular flints); moderately developed medium sub-angular blocky structure; friable to firm; non-calcareous; gradual smooth boundary to:
25-62	Brown (7.5YR 5/3) medium silty clay loam; stoneless; weakly developed medium sub-angular blocky structure; friable to firm; non-calcareous; diffuse smooth boundary to:
62-100 cm+	Light brown (7.5YR 5/4) heavy silty clay loam; stoneless; weakly developed coarse sub-angular blocky structure; firm; porous; non-calcareous.

2.6 These soils are freely-draining (Soil Wetness Class I to II) and have a high capacity to absorb excess winter rainfall.

SHALLOW SOILS OVER CHALK

2.7 These soils are found in the south-west of the site where drift cover is absent. They comprise medium loamy topsoil, separated from underlying chalk by a thin layer of subsoil or chalk residuum.

2.8 An example profile is described below from a pit at observation 6 (Map 1).

0-29 cm	Dark greyish brown (10YR 4/2) medium to heavy silty clay loam; very slightly stony (small soft rounded chalk); moderately developed medium sub-angular blocky structure; friable; calcareous; clear smooth boundary to:
29-35	Light brown (7.5YR 5/4) silty clay; very slightly stony (small soft rounded chalk); weakly developed coarse sub-angular blocky structure; firm; calcareous; clear uneven boundary to:
35 cm+	Hard fractured chalk.

2.1 These soils are freely-draining (Soil Wetness Class I) and have a high capacity to absorb excess winter rainfall.

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the former 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 Agricultural Land Classification (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 Classification[2]. The relevant site data for an average elevation of 41 m is given below.

• Average annual rainfall:	745 mm
• January-June accumulated temperature >0°C	1449 day°
• Field capacity period (when the soils are fully replete with water)	155 days mid Nov–mid Apr
• Summer moisture deficits for:	wheat: 115 mm potatoes: 110 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 Agricultural Land Classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food[3]. There are no climatic limitations at this locality.

SURVEY RESULTS

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

Grade 2

3.5 This land has deep silty soils (see paragraphs 2.4 to 2.6). Under the warm local climate, the subsoils hold slightly suboptimal moisture reserves and droughtiness may reduce crop yields in drier summers.

[2]Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.
[3]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3a

3.6 This land is found in the south-east of the site and has shallow soils over chalk (see paragraphs 2.7-2.9). Although plant roots are reportedly able to extract some moisture directly from underlying chalk, moderate droughtiness is likely to impact yields of arable crops due to suboptimal soil moisture reserves.

Non Agricultural land

3.7 Large areas in the south and east of the site are under deciduous planted woodland and thick scrub. The trees are approximately 20 years of age, and their removal to return this area to agricultural production would be a significant undertaking considered beyond normal agricultural operations.

3.8 Also included is a small wooded strip in the west and a number of small stable blocks in the north.

Grade areas

3.9 The boundaries between the different grades of land are shown on Map 3 and the areas occupied by each are shown below.

Table 1. Areas occupied by the different land grades

Grade/subgrade	*Area (ha)*	*% of the land*
Grade 2	1.7	43
Subgrade 3a	0.8	20
Non Agricultural	1.5	37
Total	4.0	100

4.0 Soil resources and their use

4.1. As part of the Government's 'Safeguarding our Soils' Strategy, the Department for Environment, Food and Rural Affairs (Defra) published a code of practice on the sustainable use of soils on construction sites, which can be helpful in design of developments and setting planning conditions. An Environment Agency strategy Soil a Precious Resource: Our strategy for protecting, managing and restoring soil (Environment Agency, 2007) has complementary aims.

Topsoil

4.2. If the site were to be developed, the topsoils are medium textured (loamy), low in stone content, hold high reserves of moisture and are natural fertile. They would represent a high quality resource for reuse in gardens and landscaping.

Subsoil

4.3. The subsoils are naturally permeable and susceptible to compaction during construction activities which could result in restricted rooting depth, increased droughtiness and risk of localised flooding. If compacted during construction, subsoils should be loosened before any topsoil is spread on them.

Soil Handling

4.4. Areas not being built over (e.g. environmental buffers and landscape areas) should not be trafficked by construction vehicles as this will render the soils impermeable, preventing percolation of rainfall beyond the base of the topsoil, which will quickly become saturated.

4.5. Stripped topsoil should be stored in separate resource bunds no more than 3 m high and kept grassed and free from construction traffic until required for re-use. The Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra, 2009) provides guidance on good practice in soil handling.

APPENDIX

MAPS AND DETAILS OF OBSERVATIONS

Land east of Dover Road, Deal: ALC and soil resources 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	0-27	HZCLslca	0	27-90+	HZCL	x				2	I	2	W
2	0-26	MZCL	0	26-100+	MZCL	o				2	I	1	
3	0-28	MCLca	0	28-34	MCL	xx	34+	Hard chalk		3	I	3a	D
4	0-22	MZCL	0	22-100+	slstMZCL	xx				2	I	2	D
5	0-18	ZL	0	18-90+	slstZL	xx				2	I	Non Agricultural	
6	0-29	M/HZCL	0	29-35	ZC	o	35+	Hard chalk		2	I	3a	D
7	0-28	MZCL	0	28-62	MZCL	o	62-100+	HZCL	xx	3	I	2	D
8	0-27	MZCLslca	0	27-50	MZCL	xx	50-90+	HZCL	xx	1	II	Non Agricultural	
9	Impenetrable thick scrub – not surveyed											Non Agricultural	
10	0-25	MZCL	<5	25-62	MZCL	o	62-100+	HZCL	o	1	I	Non Agricultural	

Key to table

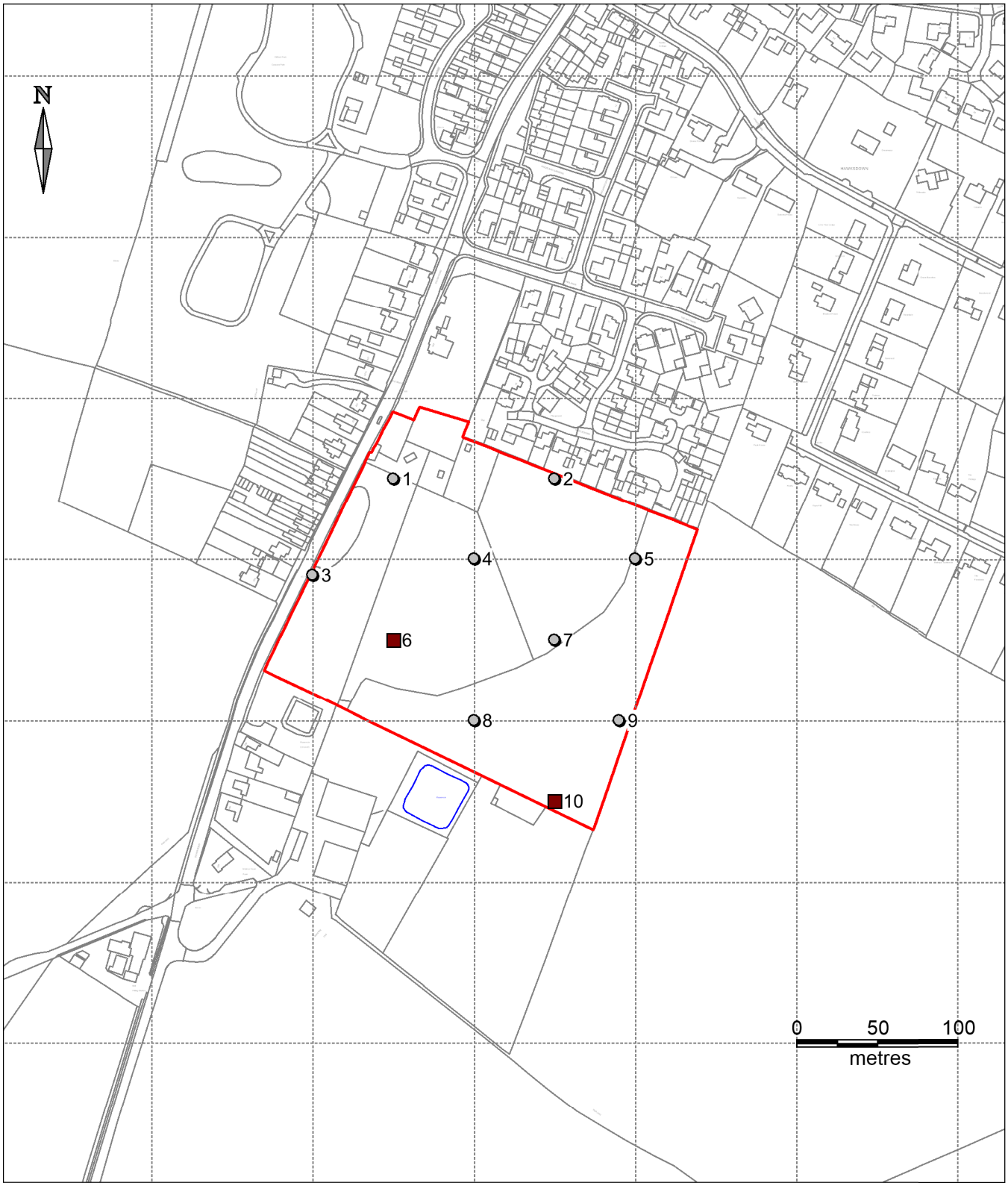
Mottle intensity:
- o unmottled
- x few to common rusty root mottles (topsoils) or a few ochreous mottles (subsoils)
- xx common to many ochreous mottles and/or dull structure faces
- xxx common to many greyish or pale mottles (gleyed horizon)
- xxxx dominantly grey, often with some ochreous mottles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



Client:

GLADMAN

Project:

Dover Road, Deal

Map title:

Map 1
Survey observations

KEY

Survey observation

Soil/land grade description pit

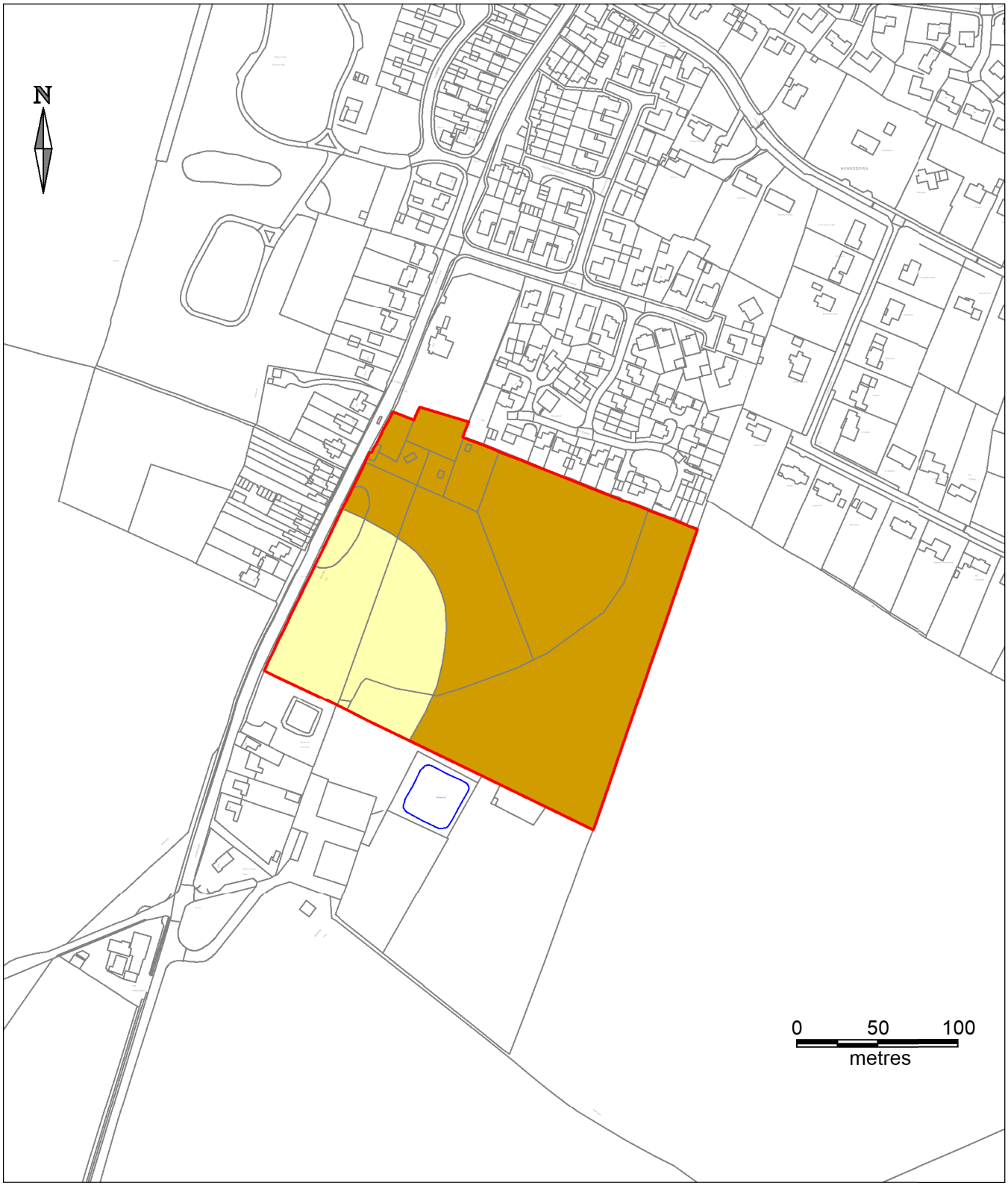
Survey area

Scale: 1:3,500 at A4

Date: 20/02/2017

Land Research ASSOCIATES

Lockington Hall
Lockington
Derby DE74 2RH
Tel: 01509 670570



Client:

GLADMAN

Project:

Dover Road, Deal

Map title:

Map 2
Soil Types

KEY

- Deep silty soils
- Shallow soils over chalk
- Survey area

Scale: 1:3,500 at A4

Date: 20/02/2017

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Lockington Hall
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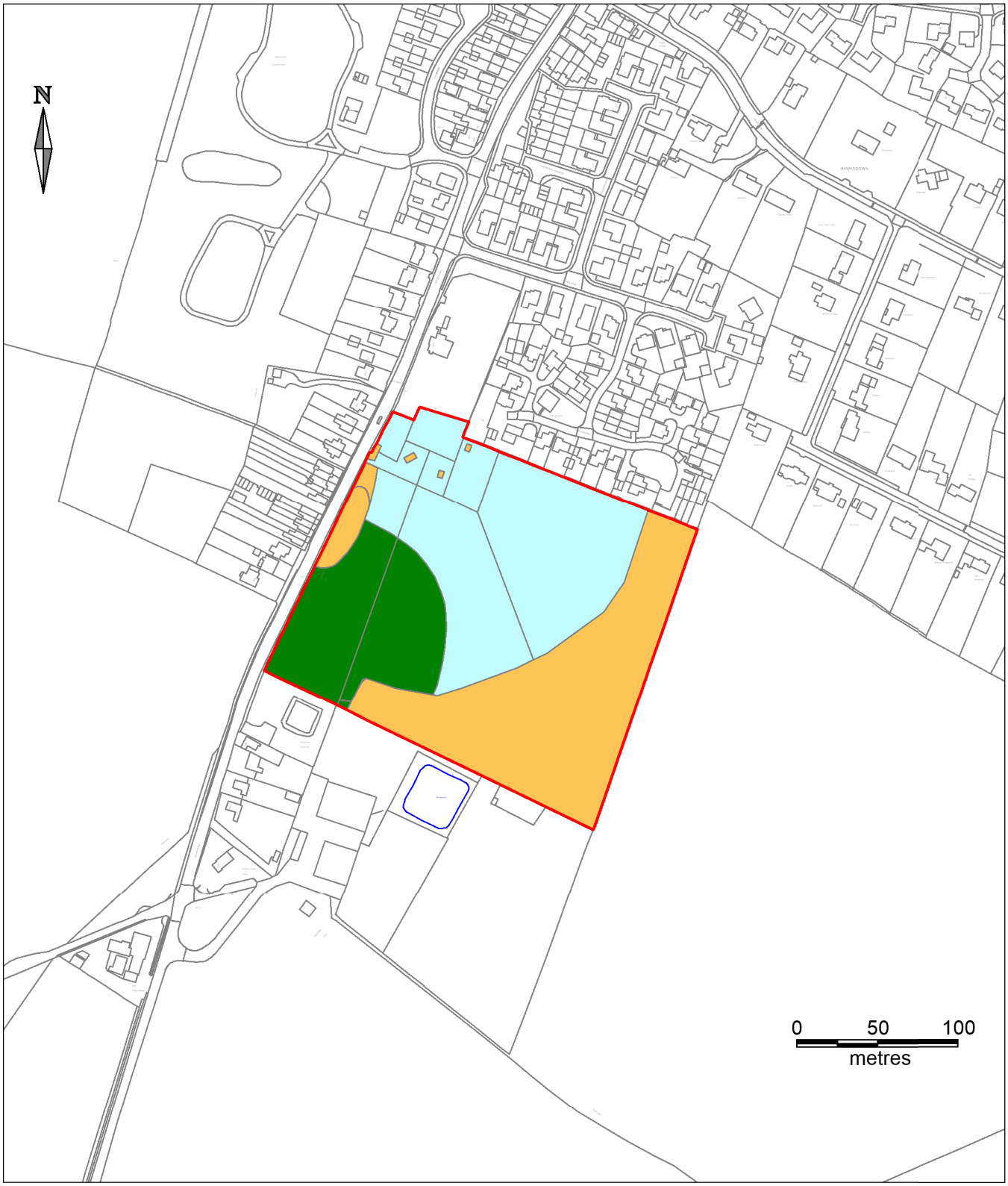
Tel: 01509 670570



Client: GLADMAN

Project: Dover Road, Deal

Map title: Map 3 Agricultural Land Classification

KEY

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

Scale: 1:3,500 at A4

Date: 20/02/2017

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Lockington Hall
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Derby DE74 2RH
Tel: 01509 670570