

**SOILS AND  
AGRICULTURAL QUALITY  
OF LAND OFF CROSS ROAD  
DEAL**

Report 1277/2

21<sup>st</sup> March, 2019

**SOILS AND AGRICULTURAL QUALITY  
OF LAND OFF CROSS ROAD, DEAL**

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Report 1277/2  
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## **SUMMARY**

This report provides information on the soils and agricultural quality of 3.94 ha of land off Cross Road, Deal, Kent.

The soils are medium and heavy silty clay loams over chalk at variable depths. The site is of grade 2 and subgrade 3a agricultural quality, limited by droughtiness.

Were the site to be developed, the medium and heavy silty clay loam topsoils would provide high and moderate quality resources, respectively, for reuse in landscaping. They require careful handling to prevent compaction damage under wet conditions.

## 1.0 Introduction

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- 1.1 This report provides information on the soils and agricultural quality of 3.94 ha of land off Cross Road, Deal, Kent. The report is based on a survey of the land in January 2017.

### **SITE ENVIRONMENT**

- 1.2 The survey area comprises a single field, bordered to the west by Cross Road, the south by Ellens Road and to the north and east by residential properties.
- 1.3 The land is sloping with an average elevation of approximately 25 m AOD.

### **AGRICULTURAL USE**

- 1.4 The field was under a cereal crop at the time of survey.

### **PUBLISHED INFORMATION**

- 1.5 1:50,000 scale BGS information records the land to be underlain by Seaford Chalk and Margate Chalk. No superficial deposits are recorded.
- 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, fine silty calcareous soils that are deep in valley bottoms but shallow over chalk on valley sides<sup>1</sup>.
- 1.7 Provisional Agricultural Land Classification (ALC) mapping of the site shows the land as grade 2. No more detailed mapping is available.

<sup>1</sup>Jarvis M. G., 1984. *Soils and their use in South East England*. Soil Survey of England and Wales, Bulletin No. 15, Harpenden.

## 2.0 Soils

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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 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.

### SOILS

2.3 The soils vary in depth over chalk across the site.

#### Shallow loams over chalk

2.4 These soils are found on plateaus and ridges in the north of the site. The soils are either heavy or medium silty clay loams over chalk at between 30 and 40 cm depth.

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

|         |   |
|---------|---|
| 0-27 cm | Dark brown (7.5YR 3/2) medium silty clay loam; slightly stony (small and medium hard subangular flint and small soft rounded chalk); moderately fine subangular blocky structure; friable; very calcareous; gradual uneven boundary to: |
| 27 cm+  | Fractured chalk.  |

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

#### Deep loams over chalk

2.7 These soils are located in the lower slopes and at the bottom of the valley in the south of the site. The soils are medium or heavy silty clay loams over permeable heavy silty clay loams.

2.8 An example profile is described below from a pit at grid reference 636000,150425

|         |   |
|---------|---|
| 0-30 cm | Brown (7.5YR 5/3) medium silty clay loam; slightly stony (small and medium hard subangular flints); moderately developed fine subangular blocky structure; friable; calcareous; smooth gradual boundary to: |
|---------|---|

30-100 cm+ Reddish yellow (7.5YR 6/6) heavy silty clay loam; slightly stony (small and medium hard subangular flint stones and small rounded soft chalk); a few fine diffuse dark grey (7.5YR 4/1) mottles; moderately developed medium subangular blocky structure; friable; very calcareous.

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

### 3.0 Agricultural land quality

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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<sup>2</sup>. The relevant site data for an average elevation of 25 m is given below.

- Average annual rainfall: 724 mm
- January-June accumulated temperature >0°C 1469 day°
- Field capacity period 151 days  
(when the soils are fully replete with water) mid Nov–mid Apr
- Summer moisture deficits for: wheat: 118 mm  
potatoes: 114 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<sup>3</sup>. There are no climatic limitations at this locality.

#### **SURVEY RESULTS**

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

#### **Grade 2**

3.5 This land comprises shallow silty clay loam soils over chalk at less than 45 cm depth. This land is restricted by droughtiness as the shallow soil depth over porous chalk results in a low moisture storage capacity, leading to a slight reduction in crop yield.

<sup>2</sup>Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

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

### **Subgrade 3a**

- 3.6 Land with a soil depth of greater than 45 cm make up this grade. The soils are slightly restricted by droughtiness due to the permeable silty clay loams holding limited moisture reserves which will affect crop water uptake in dry summer months.

### **Grade areas**

- 3.7 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**

| <i>Grade/subgrade</i> | <i>Area (ha)</i> | <i>% of the agricultural land</i> |
|-----------------------|------------------|-----------------------------------|
| <b>Grade 2</b>        | 2.68             | 68                                |
| <b>Subgrade 3a</b>    | 1.26             | 32                                |
| <b>Total</b>          | 3.94             | 100                               |



## 4.0 Soil resources and their use

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- 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. The topsoils are difficult to handle with machinery and are highly susceptible to compaction damage when wet. If the site were to be developed, soil handling would be best performed between late May and early October when the soils are likely to be drier.

### **Subsoil**

- 4.3. The subsoils are 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 off Cross Road, Deal: ALC and soil resources survey – Details of observations at each sampling point

| Obs No | Topsoil    |           | Upper subsoil     |            | Lower subsoil |          | Slope (°) | Wetness Class | Agricultural quality Grade | Main limitation |
|--------|------------|-----------|-------------------|------------|---------------|----------|-----------|---------------|----------------------------|-----------------|
|        | Depth (cm) | Texture   | Stones >20 mm (%) | Depth (cm) | Texture       | Mottling |           |               |                            |                 |
| 1      | 0-28       | MZCL ca   | 5                 | 28+        | Chalk         |          | 0         | I             | 3a                         | D               |
| 2      | 0-34       | HZCL ca   | 5                 | 34-50      | HZCL x ca     | o        | 1         | I             | 2                          | D               |
| 3      | 0-34       | HZCL x ca | 5                 | 34+        | Chalk         |          | 0         | I             | 3a                         | D               |
| 4      | 0-38       | MZCL ca   | 5                 | 38-56      | HZCL ca       | o        | 1         | I             | 2                          | D               |

### 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)

#### 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

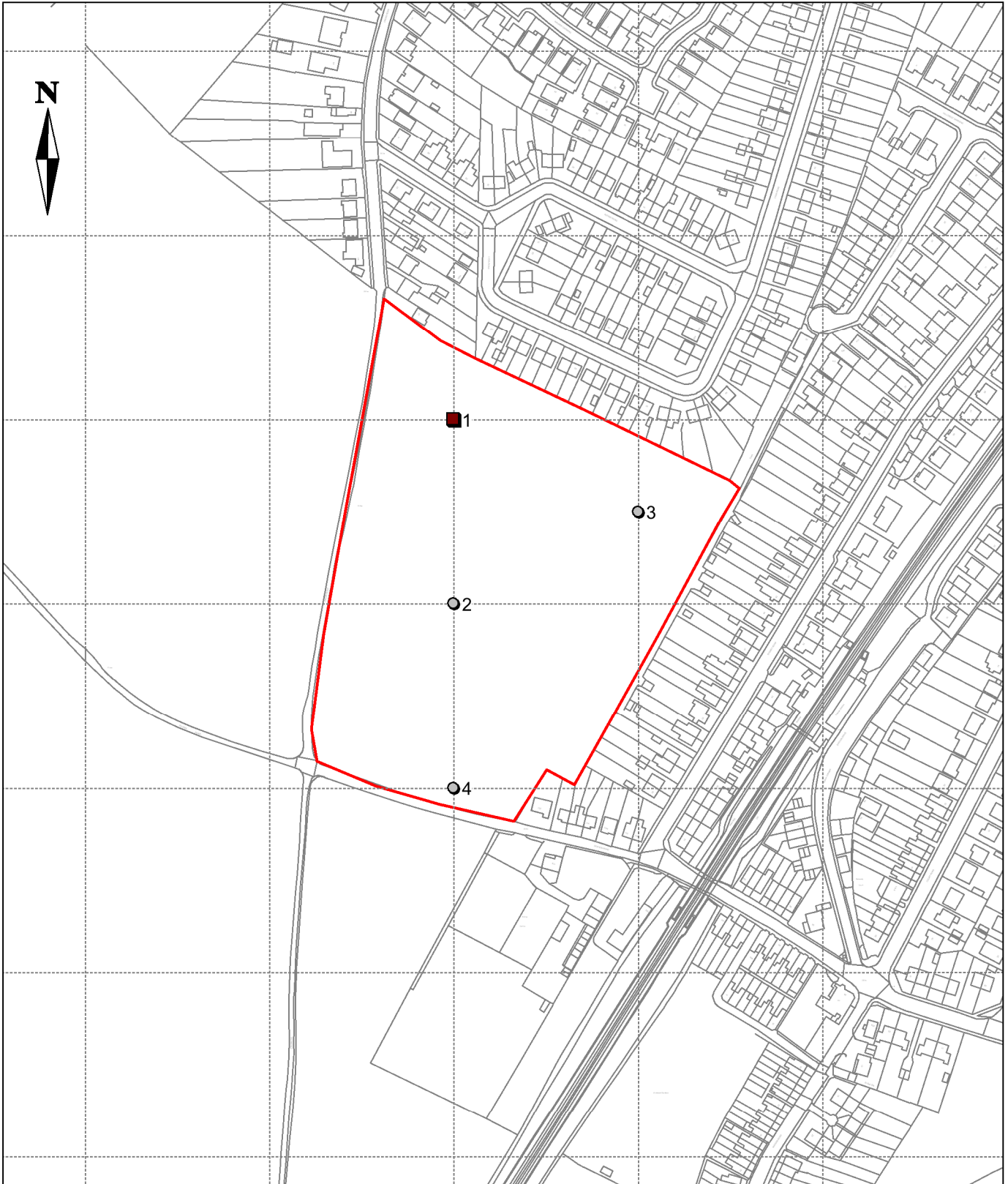
#### Limitations:

- 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
- mm - 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

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)



Client:



Project:

Cross Road, Deal

Map title:

Map 1  
Survey observations

**KEY**

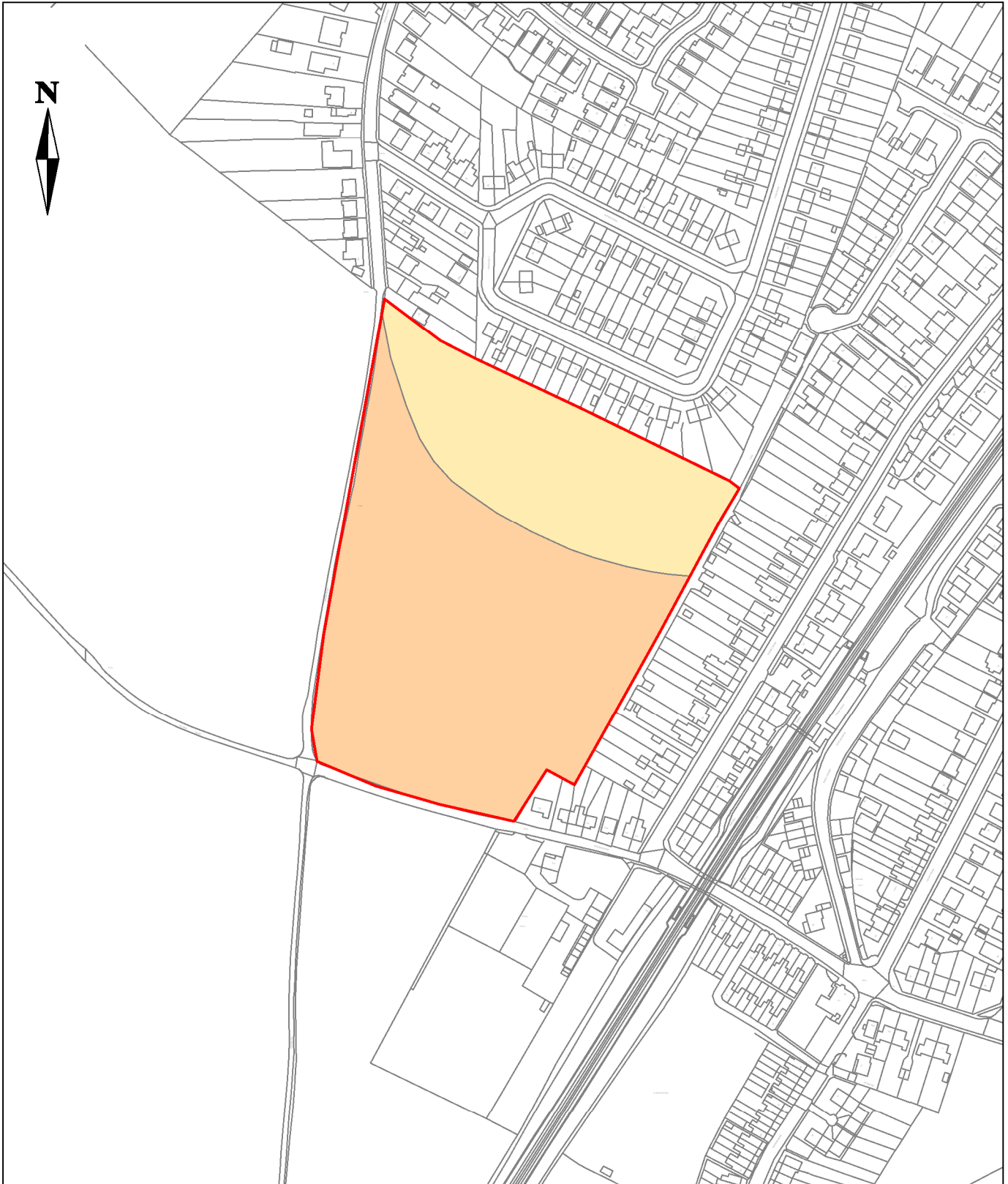
- Survey observation
- Soil/land grade description pit
- Survey area

Scale: 1:3,000

Date: 21/03/2019



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Client:






Project:

Cross Road, Deal

Map title:

Map 2  
Soil Types

**KEY**

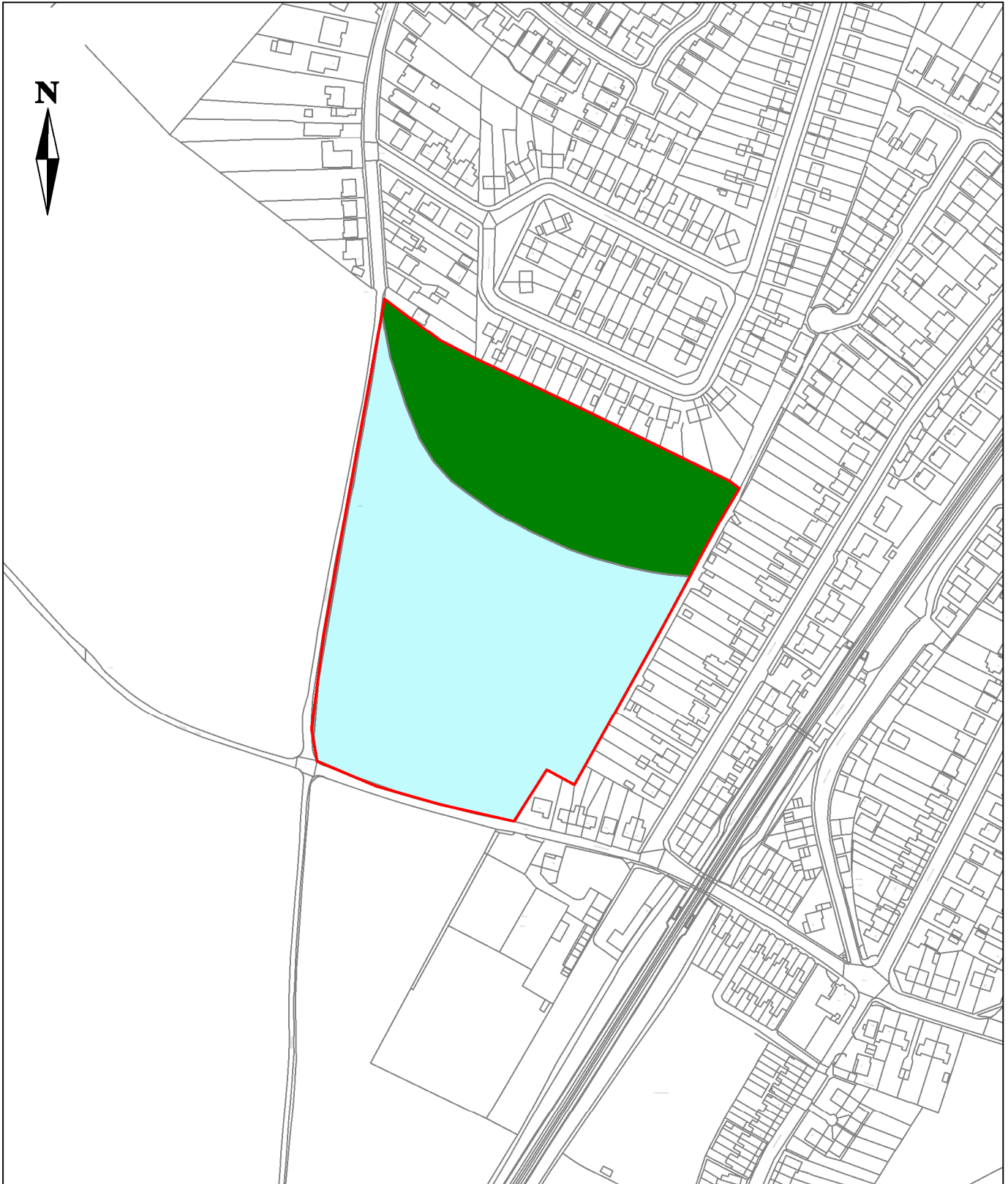
-  Shallow soils over chalk
-  Deep soils over chalk
-  Survey area

Scale: 1:3,000

Date: 21/03/2019

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Client:



Project:

Cross Road, Deal

Map title:

Map 3  
Agricultural Land  
Classification

**KEY**



Grade 2



Subgrade 3a



Survey area

Scale: 1:3,000

Date: 21/03/2019

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