



Report on Agricultural Land Classification (ALC) for Statera Energy Ltd

Site

4 fields at Rookery Farm south of East Claydon National Grid substation
Granborough
Buckinghamshire
MK18 3NL

Field	Area (Ha)
Arch Elms	5.3
Long Ditch	7.5
Old Ploughing	7.3
Sandhill	4.5
Total	24.6

Soil survey and report carried out in November 2022

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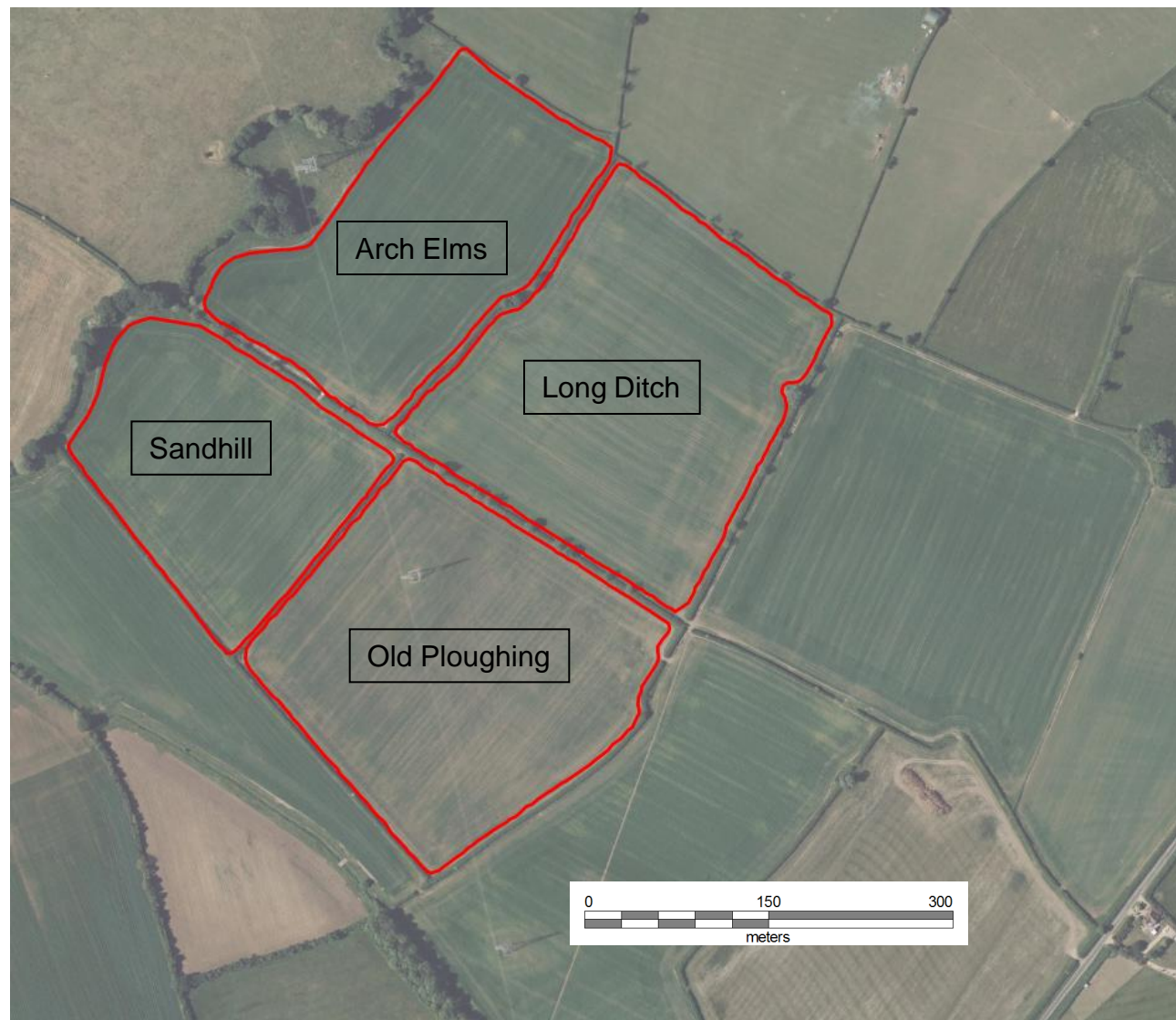
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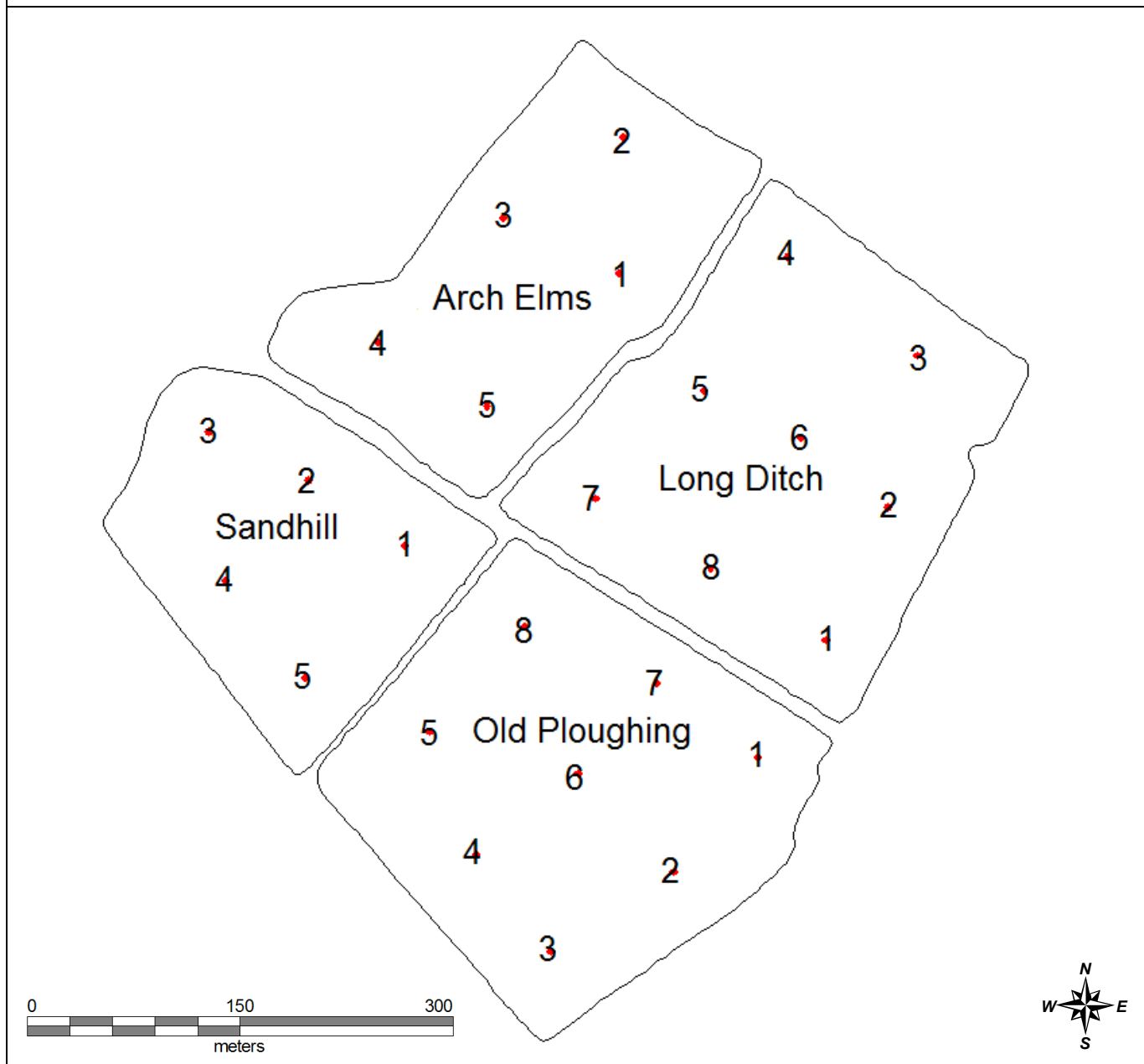
The cropping on these
fields is arable or grass
ley

Map 1: Area of land surveyed in Nov 2022 at Rookery Farm, East Claydon



Map 2: Location of points surveyed in Nov 2022 at Rookery Farm, East Claydon

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Introduction

The criteria for assessing agricultural land classification (ALC) are taken from guidelines issued by DEFRA or formerly the Ministry of Agriculture, Fisheries & Food in 1988. They are based on assessing grading according to four categories, 1) climatic, 2) site, 3) soil & 4) interactive. The grading is then made according to the most limiting factor. Where these factors vary in the field then assessments are made approximately every 1.6 hectares & a land classification map of the field is drawn up according to the most limiting factor.

1) The climate in this area is good for agriculture and there are no limitations from the climate itself. The criteria are given below:

- Average annual rainfall: 680mm
- Jan to June accumulated temperature >0°C 1397 day°
- Field capacity period 142 days
(when the field drains flow in winter)
- Summer moisture deficits for:

wheat:	105mm
potoatoes:	97mm

Field capacity and summer moisture deficits will be used later in the report together with some of the soil properties to establish the land grade.

2) Site limitations are based on a) gradient, b) microrelief & c) flooding risk.

a) The gradient on the 4 fields is less than 7 degrees in all directions which means that there is no limitation according to gradient.

b) The microrelief has no irregularities such as pits or boulders which would limit the grading.

2c) Flooding risk was not assessed over the farm since it requires observations to be made over a number of years. Appendix 2 at the end of this report details the observations required.

3) Soil limitations are based on a) soil depth to consolidated or fragmented rock, b) stoniness & c) chemical status.

a) Soil depth to consolidated or fragmented rock/stone is greater than 60cm at every point and therefore there is no limitation for depth.

b) Stone content is less than 5% in all places except one which was about 5% by observation. Measurement (not done) usually gives a value less than observation so there is probably no limitation according to stone content and it's certainly no worse than grade 1 or 2.

c) Chemical status that may show up toxicity in the soil is unlikely since in the past, the fields have only been used for agriculture and any inputs would be for agricultural use and not contain any potential toxicity.

4) Interactive limitations are based on a) droughtiness & b) soil wetness (page 11).

a) droughtiness is calculated according to available water capacity (AP). This is estimated using standard values of the soil texture, stone content & soil structure at each survey point down to a depth of 120cm for wheat & 70cm for potatoes (figure 1 on page 9 below). Each profile was assessed on a 1cm core taken down to a depth of 100cm.

The grading is calculated from the moisture balance for both wheat & potatoes. The moisture balance is the available water capacity minus the climatic moisture deficit for that area. The moisture deficit for this area for wheat is 105mm & for potatoes is 97mm see agro-climatic data on page 5.

The soils on this site were grade 2 according to droughtiness. However this factor is not the limiting one.

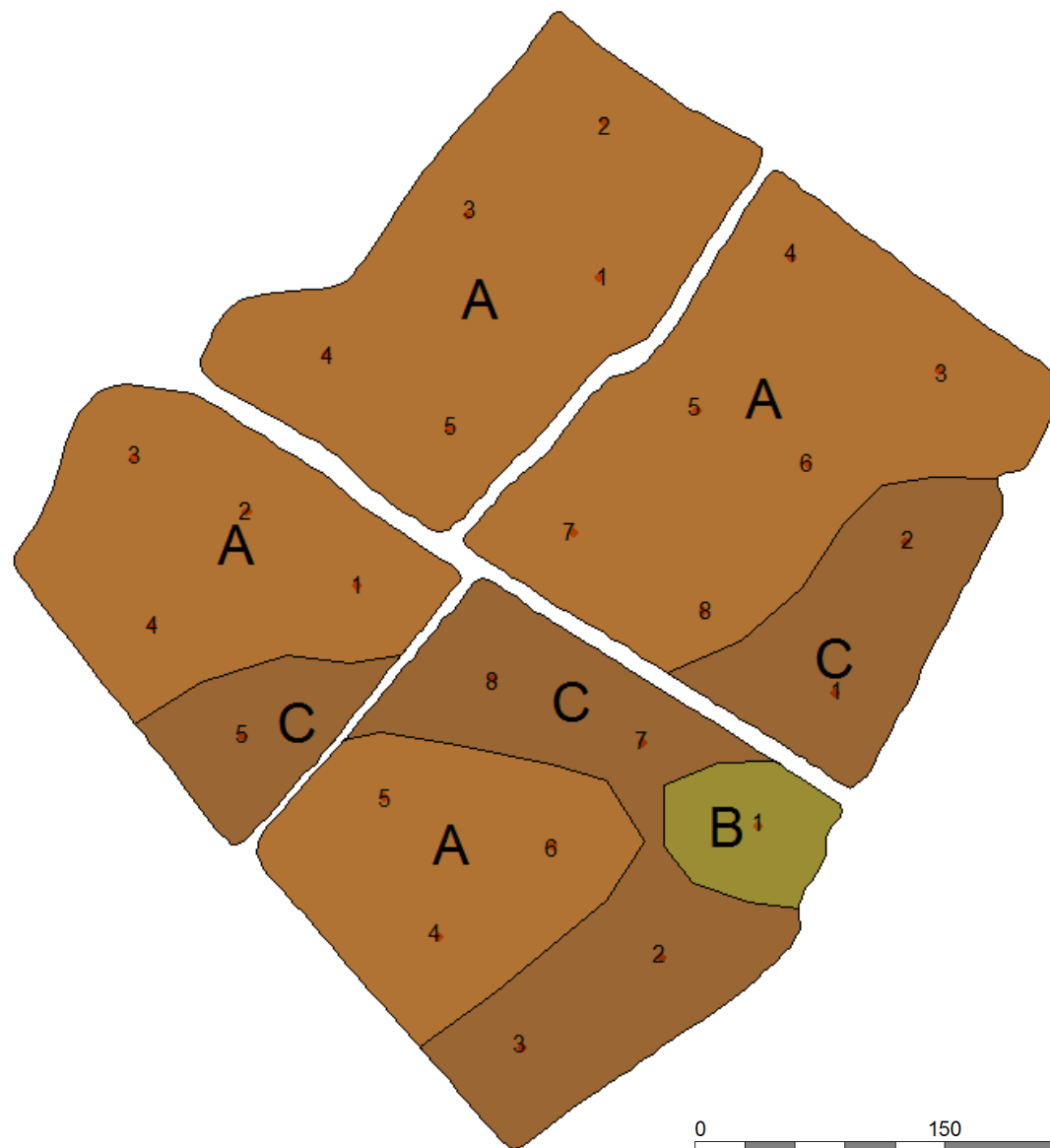
Soil descriptions



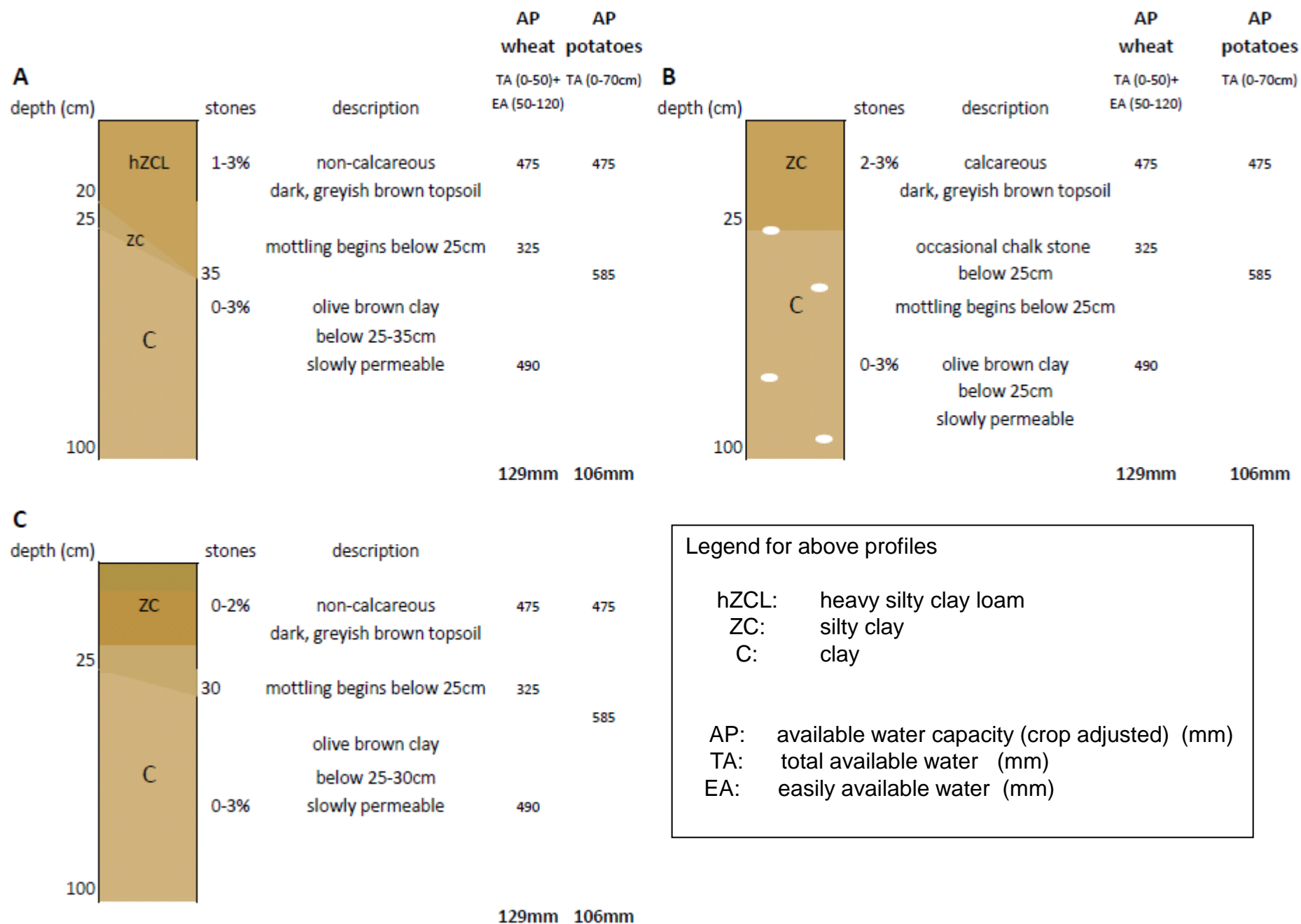
A – heavy silty clay loam over slowly permeable clay
B – calcareous silty clay over slowly permeable clay
C – non-calcareous silty clay over slowly permeable clay

For a fuller description see profile descriptions on next page

Map 3: Soil types for the surveyed area of Rookery Farm



Page 9: Figure 1 –**Soil profile descriptions for this site** and available water estimates (AP) for wheat and potatoes



4b) soil wetness class is assessed from

- 1) the depth to a gleyed (mottled) horizon
- 2) the depth to a slowly permeable layer
- 3) the duration of field capacity when no further rain can be held in the soil and it drains out (142 days at this site see Agro-climatic data on page 5).

The photos on pages 11 and 12 show the soil cores between 30 and 40cm depth from which the soil wetness class can be derived using the information above.

The wetness class for each soil is then plugged into table 1 on page 13. Along with topsoil texture and field capacity days, this is used to obtain the land grade according to wetness. Page 14 summarizes these findings.

Each photo shows the olive brown colour of the subsoil matrix between 30 and 40cm depth. Ochreous (rusty) mottling can be clearly seen which is an indication of a gleyed horizon starting above 40cm depth. This coupled with the slowly permeable clay means that the soil is wetness class IV and the subsoil below 40cm lies wet for much of winter. Occasional ferri-manganiferous concentrations are also present as marked by an X

Fig 2a : Photos of soil cores on this site for the same soil type A on 3 different fields. The profiles are described more generally on page 10.

Soil A



Each photo shows the olive brown colour of the subsoil matrix between 30 and 40cm depth. Ochreous (rusty) mottling can be clearly seen which is an indication of a gleyed horizon starting above 40cm depth. This coupled with the slowly permeable clay means that the soil is wetness class IV and the subsoil below 40cm lies wet for much of winter.

Occasional ferri-manganiferous concentrations are also present as marked by an **X**

Soil B is calcareous in the topsoil and bits of chalk can be seen in the subsoil as marked by a **Y**

Fig 2b : Photos of soil cores on this site for soil types B and C. The profiles are described more generally on page 10.

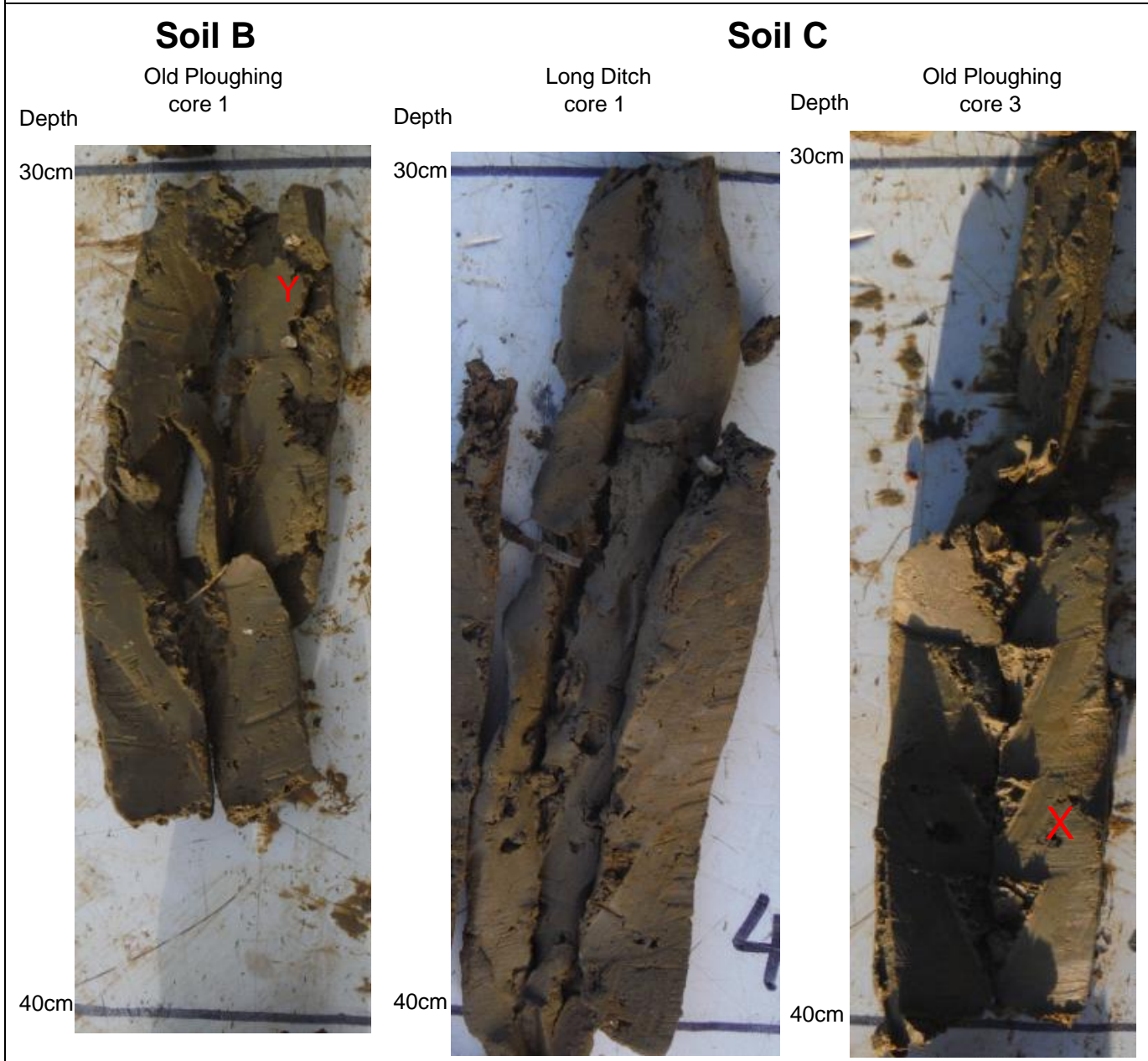


Table 1 - Criteria for grading soil according to wetness on this site

Agricultural Land Classification of England and Wales

Table 6 Grade according to soil wetness - mineral soils

Wetness Class WC	Texture ¹ of the top 25 cm	Field Capacity Days				
		<126	126- 150	151- 175	176- 225	>225
I	S ² LS ³ SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
II	S ² LS ³ SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
III	S ² LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
IV	S ² LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
V	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5

Soils in Wetness Class VI - Grade 5

¹For naturally calcareous soils with more than 1% CaCO₃ and between 18% and 50% clay in the top 25 cm, the grade, where different from that of other soils, is shown *in brackets*

An explanation of table 1 above

The most limiting agricultural land classification (ALC) factor is soil wetness.

Table 1 on the previous page is used to allocate ALC grade according to:

1. Wetness class (WC IV)
2. Topsoil texture varies from heavy silty clay loam (hZCL) to silty clay (ZC) as assessed in the field by finger texturing.
3. Field capacity days or the number of days in the year that the field is at field capacity. Climatic data give this value as 142 days for this site.

Since all 3 soil types are wetness class IV and the topsoil is either heavy silty clay loam or silty clay then the ALC grade is 3b as shown in table 1 above.



Map 3 - Limiting agricultural land classification (ALC) grade for the surveyed area of Rookery Farm, East Claydon

ALC grade %area



2



3a



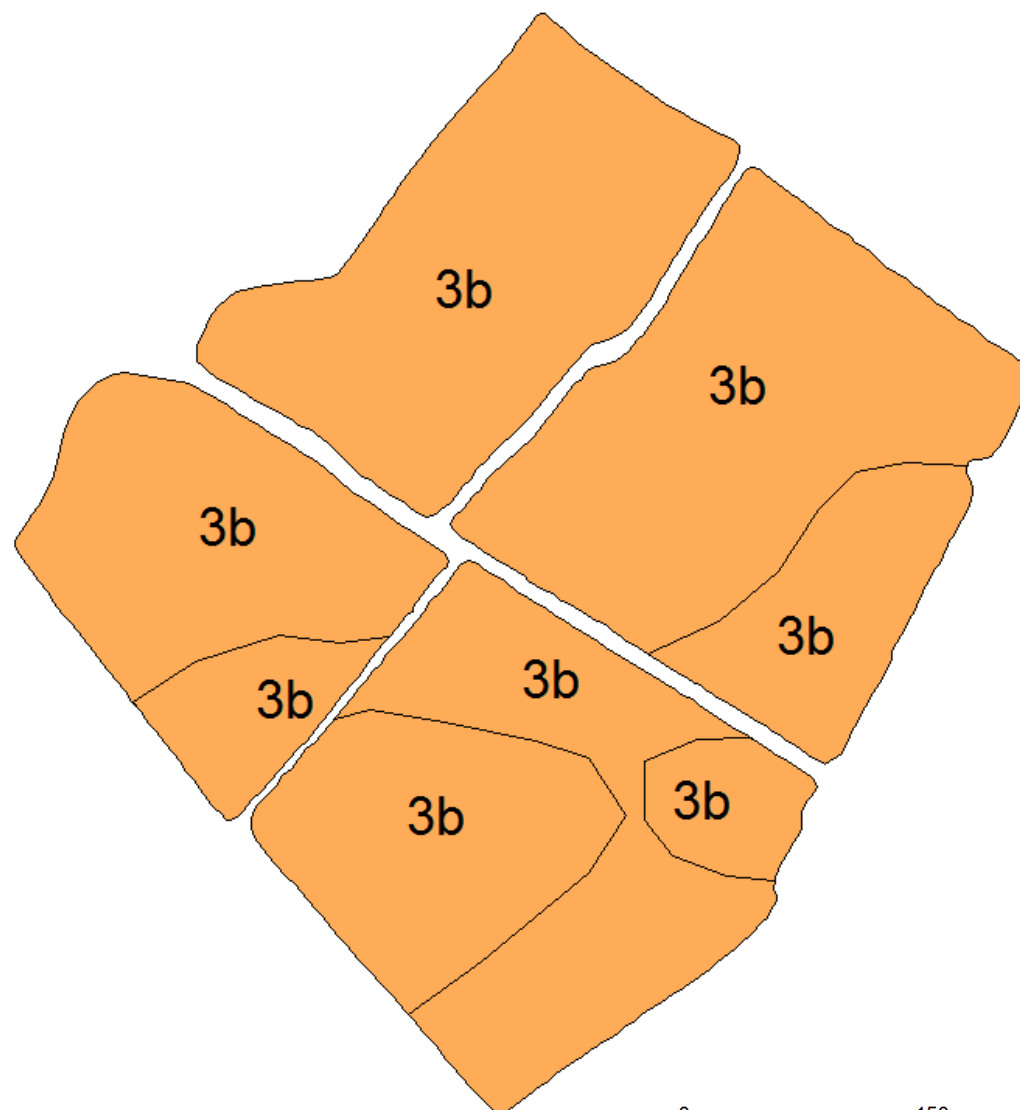
3b

100%



4

Soil wetness is the only limiting factor on this site



0 150 300
meters

Executive summary of surveyed land at East Claydon.

Grades 2 & 3a make up 0% of the site.

Grade 3b makes up 100% of the site or 24.6ha.

Description of the yielding qualities and cropping suitability of the different ALC grades is given in appendix 1 on the next page.



SECTION 2

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

Subgrade 3b - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Appendix 2

Table 2 Grade according to flood risk in summer

Grade/ Subgrade	Flood limits	
	<i>frequency</i>	<i>duration</i>
1	very rare	short
2	rare	short
3a	very rare	medium or long
	or rare	medium
	or occasional	short
3b	rare	long
	or occasional	medium
4	occasional	long
	or frequent	short or medium
5	frequent	long

Table 3 Grade according to flood risk in winter

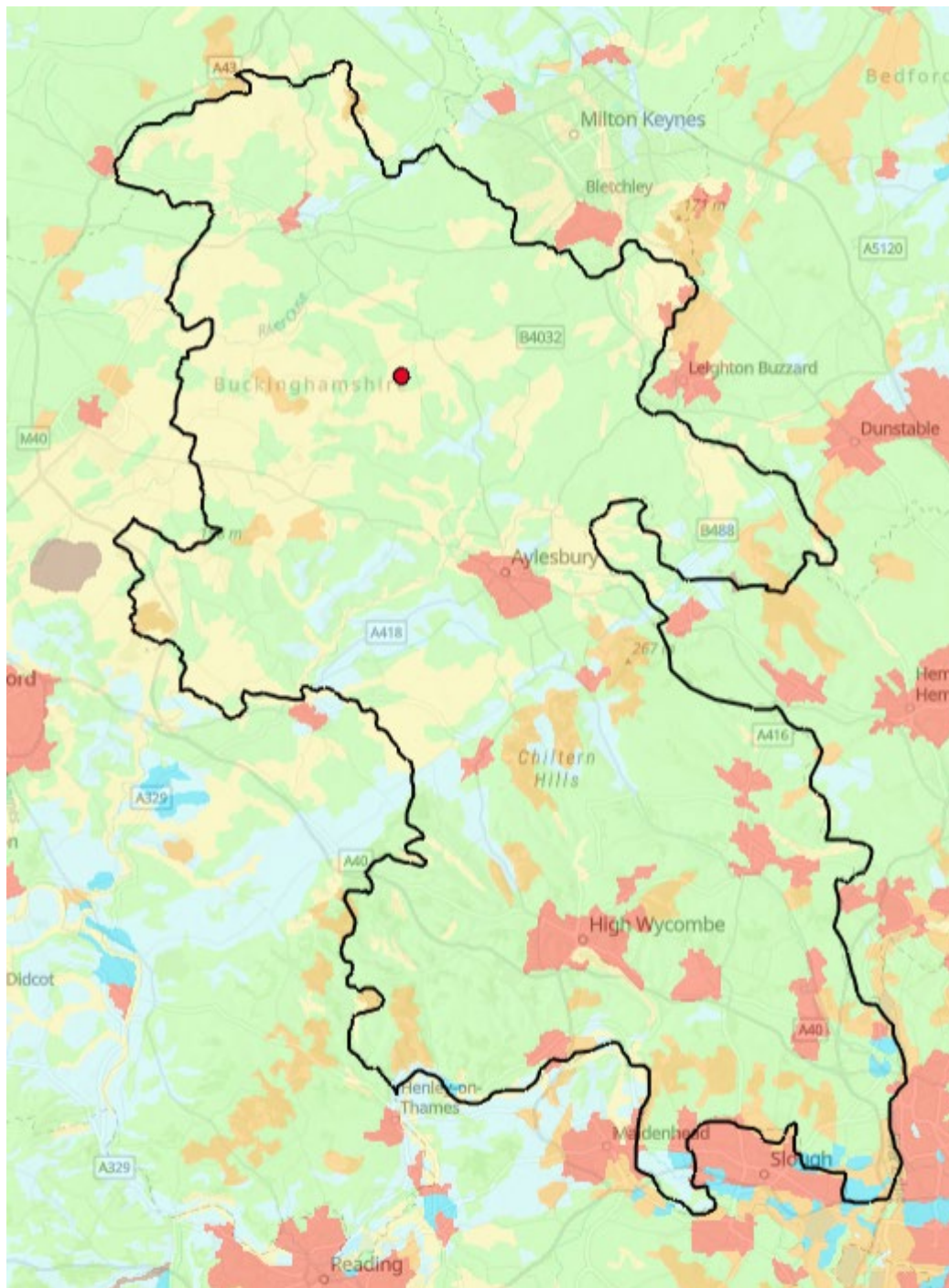
Grade/ Subgrade	Flood limits	
	<i>frequency</i>	<i>duration</i>
1	rare	short
2	rare	medium
3a	or occasional	short
	rare	long
	or occasional	medium
3b	or frequent	short
	occasional	long
	or frequent	medium
4	frequent	long

The terms used in Tables 2 and 3 are defined as follows:

Season summer - mid March to mid November
 winter - mid November to mid March

Duration short - not more than 2 days (48 hours)
 medium - more than 2 but not more than 4 days
 long - more than 4 days

Frequency very rare - not more than once in 15 years
 rare - once in 10 to once in 14 years
 occasional - once in 3 to once in 9 years
 frequent - more than once in 3 years



Grade 1 – 1%

Grade 2 – 6%

Grade 3 – 60%

Grade 4 – 21%

Grade 5 – 0%

Non-Agricultural – 7%

Urban – 5%