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WEST OXFORDSHIRE LOCAL PLAN
Land at Old Woodstock
Oxfordshire

Agricultural Land Classification
ALC Map and Report

September 1998

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AGRICULTURAL LAND CLASSIFICATION REPORT

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LAND AT OLD WOODSTOCK
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INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 21 hectares of land at Old Woodstock, in Oxfordshire. The survey was carried out during September 1998.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The survey was carried out in connection with MAFF's statutory input to the West Oxfordshire Local Plan. This survey supersedes any previous ALC information for this land. Information from an ALC survey on adjacent land (FRCA reference number: 3305/095/94) was used in the classification of this site.

3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey the agricultural land use on the site was mostly in stubble with some marshland along the River Glym floodplain. The areas mapped as 'Other land' include woodland. A small area of land was not surveyed as this was believed to be under different ownership; the land consisted of two small paddocks grazed by horses.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

7. The fieldwork was conducted at an average density of 1 borings per hectare of agricultural land. In total, 17 borings, 2 soil pits and 2 sieve measurements were described.

8. The agricultural land on this site has been classified as Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). The limitations to land quality include soil droughtiness, soil wetness and topsoil stoniness.

Table 1: Area of grades and other land

[1] FRCA is an executive agency of MAFF and the Welsh Office

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	9.0	52.9	42.8
3b	6.0	35.3	28.6
4	2.0	11.8	9.5
Agricultural land not surveyed	1.0	N/A	4.8
Other land	3.0	N/A	14.3
Total surveyed area	17.0	100	80.9
Total site area	21.0	-	100

9. Subgrade 3a land is located in two separate areas. Soils in this mapping unit are variable and include some very good quality land. Soils are calcareous throughout and typically comprise slightly to moderately stony medium clay loam topsoils. These overlie heavy clay loam and clay subsoils which are very stony and impenetrable to the soil auger. This combination of soil properties, interacting with the local climate results in land which experiences a slight soil droughtiness problem. The effect of a slight soil droughtiness limitation may cause a reduction in crop yield and limit the flexibility of the land. In addition, other land in this mapping unit comprises soils with moderately deep slowly permeable clayey subsoils. This results in a combined soil wetness and droughtiness limitation.

10. Subgrade 3b land is mapped over most of the site. Soils are calcareous throughout and consist of slightly to moderately stony medium clay loam topsoils. These pass to moderately to very stony heavy clay loam or clay upper subsoils, which are impenetrable to the soil auger at shallow depths. Consequently, these soils only hold small reserves of water available to plant roots and this interacts with the local climate to result in a significant soil droughtiness limitation. The effect of soil droughtiness is to limit the flexibility of the land and reduce crop yields. Topsoil stoniness is limiting in localised patches, particularly on the shoulders of any slopes. A high volume of hard limestone in the topsoil has the effect of acting as an impediment to cultivation, harvesting and crop growth.

11. Grade 4 land is restricted to the flat valley floor through which the River Glyme flows. Soils are calcareous throughout comprising organic medium silty clay loams which overlie shallow slowly permeable clayey subsoils. The presence of hydrophilous vegetation is suggestive of semi-permanent waterlogging and the actual low-lying nature of the valley floor, particularly in relation to the water level of the River Glyme, further suggests that this area cannot be easily drained.

FACTORS INFLUENCING ALC GRADE

Climate

12. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

13. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SP 446 175	SP 445 173
Altitude	m, AOD	80	87
Accumulated Temperature	day°C (Jan-June)	1419	1411
Average Annual Rainfall	mm	685	690
Field Capacity Days	days	150	151
Moisture Deficit, Wheat	mm	103	102
Moisture Deficit, Potatoes	mm	95	93
Overall climatic grade	N/A	Grade 1	Grade 1

14. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

15. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

16. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk do not affect land quality at this location. The site is climatically Grade 1. However, climatic factors do interact with soil properties to influence soil wetness and soil droughtiness. At this locality the climate is *average in regional terms.*

17. The influence of climate on soil wetness is assessed by reference to median field capacity days. At this locality, the 150/151 FCD isoline is straddled but this does not have a significant affect on grading because the soils are naturally calcareous and therefore better structured and more workable. In addition, other factors notably droughtiness and topsoil stoniness are more limiting.

Site

18. The site lies at altitudes in the range 95–80 m AOD. The highest land occurs along the western site boundary with land falling through slight to moderate gradients to the River Glyme which occupies a valley running approximately north-south. The site is not affected by site restrictions (i.e., gradient or microrelief). However, the nature of the River Glyme and its floodplain suggests that the river may flood, but probably no worse than the Grade 4 already indicated for this area. No detailed flooding information was available before the survey took place.

Geology and soils

19. The most detailed published geological information for the site (BGS, 1982) shows the majority of the area to be underlain by White Limestone, with Forest Marble outcropping on

the highest land and as an isolated patch on the centre of the survey area. In addition, alluvium is found either side of the River Glyme along the relatively wide floodplain of the river.

20. The most detailed published soils information covering the area (SSEW, 1983) shows it to comprise mostly soils of the Aberford association. These are described as 'shallow, locally brashy, well drained calcareous fine loamy soils over limestone. Some deeper calcareous soils in colluvium' (SSEW, 1983). Elsewhere soils of the Elmton 3 association are mapped. These are described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some deeper slowly permeable seasonally waterlogged, mainly calcareous, clayey soils' (SSEW, 1983). Soils consistent with these descriptions were observed across the site. Along the River Glyme floodplain, organic silty soils with shallow slowly permeable subsoils were observed.

AGRICULTURAL LAND CLASSIFICATION

21. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

22. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Subgrade 3a

23. Land of good quality is mapped in two discrete areas. It is limited by soil droughtiness and soil wetness, and includes slightly better borings that could not be distinguished separately.

24. The Subgrade 3a unit mapped along the northern boundary of the survey area is limited by both soil droughtiness and soil wetness. On the mid-slopes, soils are calcareous and comprise medium or heavy clay loam topsoils, which may contain up to 18% total hard rock by volume (2–9% > 2 cm in size). Topsoils overlie heavy clay loam or clay upper subsoils, which may contain up to 25% total hard rock by volume. From approximately 45 to 55 cm, soil profiles are impenetrable to the soil auger. Pit 7 (see Appendix II) was dug in this area and became impenetrable at a depth of 83 cm due to the stony and dry conditions encountered in the lower subsoils. It is believed the soil resource extends deeper in the pit making it slightly better than the borings. However, the shallower and stonier borings infer there is potentially less available water to a growing plant and these soil conditions interact with the climate to produce a slight soil droughtiness limitation. Conservatively, these soils are classified as Subgrade 3a. A slight soil droughtiness limitation such as this may affect the level and consistency of yields, especially in drier years. On the lower and flatter ground, soil wetness limits land quality to Subgrade 3a. Soils comprise calcareous slightly stony heavy clay loam topsoils. These overlie slightly stony heavy clay loam upper subsoils before passing to poorly structured clay lower subsoils. Pit 8 (see Appendix II) confirmed the existence of these slowly permeable horizons. It is the depth to these poorly structured layers, from 60 to 70 cm which assigns these soils to Wetness Class III. These drainage characteristics combined with the topsoil texture interact with the local climate to result in a Grade 3a land classification. This degree of soil wetness may adversely affect crop growth and development, as well as limiting the flexibility of the land due to a reduction in the number of

days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

25. A smaller area of good quality land is located in the south-west. There is variability in this mapping unit with some better land which could not be distinguished separately. Soils comprise calcareous medium clay loam topsoils, which may contain up to 8% total flints by volume. These overlie similarly textured or clay subsoils, which may contain up to 20% total flints by volume. From 46 to 87 cm, soils were impenetrable to the soil auger. The variable depth to the stonier horizons in these soils is reflected in the variation in the amount of available water that results. Given such variation, this land has again been graded conservatively as Subgrade 3a.

Subgrade 3b

26. Most of the land is classified as moderate quality and is restricted by a soil droughtiness limitation or topsoil stoniness.

27. Subgrade 3b land comprises calcareous medium clay loam topsoils, which may contain up to 25% total hardrock by volume (6–14% > 2 cm in size). Topsoils overlie shallow heavy clay loam or clay upper subsoils, which may contain up to 35% total hard rock by volume. From approximately 33 to 47 cm, soil profiles are impenetrable. In the pit observation, 1P on the adjacent survey carried out in 1994 (FRCA ref: 3305/095/94), the pit was dug to a depth of 50 cm, becoming impenetrable thereafter. Rooting was evident to this depth and is likely to continue a little further. However, even if rooting extended to 120 cm there would be no overall effect on the droughtiness of these soils. Moisture balance calculations indicate that these soils suffer from a significant soil droughtiness limitation resulting in a Subgrade 3b classification. In addition, topsoil stoniness also restricts land quality in places, particularly the shoulders of any slopes. Sieve measurements of 17% > 2 cm and 15% > 6 cm in size have been recorded at 1S and 2S respectively. The main effects of stones are to act as an impediment to cultivation, harvesting and crop growth and to cause a reduction in the available water capacity of the soil.

Grade 4

28. Poor quality land is confined to the floodplain of the River Glyme. Soils are calcareous and comprise organic silt loams over shallow, slowly permeable clayey subsoils. These soil profiles are gleyed throughout and show signs of severe waterlogging. Further evidence of more permanent waterlogging includes an abundance of hydrophilous vegetation, e.g., *Carex riparia, E. palustre* and *Lythrum salicaria.* Finally, the nature of the flat, low-lying river floodplain (particularly in relation to the water level of the River Glyme) makes it very difficult to effectively drain this area and, as such, it is felt that this land cannot be classified any better than Grade 4.

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SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No.* 236 *Witney.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6 Soils of South East England.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW: Harpenden