Ryehill Quarry, Long Buckby, Northamptonshire.

Agricultural Land Classification and Soil Physical Characteristics Report.

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Resource Planning Team
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FRCA Cambridge

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AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS REPORT

RYEHILL QUARRY, LONG BUCKBY, NORTHANTS.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 56.2ha of land to the south west of the village of Long Buckby between the A5 Trunk road and the M1 Motorway centred on grid reference SP 606 664. The survey was carried out during August 1998.

2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with an application to extract sand and gravel. This survey supersedes previous ALC information for this land.

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 land use on the site was predominantly grassland with the exception of a large field in the south east which had just been ploughed. Areas mapped as 'Other Land' consisted of a house, stables and associated road in the north west and a small industrial unit and tree lined watercourse in the south west of the site.

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.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	31.4	57	56
3a	6.3	12	11
3b	17.2	31	31
Other land	1.3		2
Total surveyed area	54.9	100	
Total site area	56.2	-	100

7. The fieldwork was conducted at an average density of one boring per hectare. A total of 54 borings and 3 soil pits was described.

8. The agricultural land within the site has been assessed as a mix of Subgrade 3b (moderate quality land) and Grade 2 (very good quality land), with a small area of Subgrade 3a (good quality land). The limitation to the quality of the agricultural land in the west is significant or moderate wetness/workability, whilst elsewhere the main limitation is one of slight or moderate droughtiness.

FACTORS INFLUENCING ALC GRADE

Climate ·

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

10. 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 606 664
Altitude	m, AOD	100
Accumulated Temperature	day°C (Jan-June)	1371
Average Annual Rainfall	mm	678
Field Capacity Days	days	151
Moisture Deficit, Wheat	mm	99
Moisture Deficit, Potatoes	mm	89
Overall climatic grade	N/A	1

11. 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.

12. 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 (ATO, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site mean there is no overriding climatic limitation within the site and hence the overall climatic grade is Grade 1.

Site

14. The maximum altitude of approximately 123 m AOD occurs on a hill in the north of the site with slopes from the hill top falling to the south and south west. A further, smaller hill is found in the south east and rises to a maximum altitude of approximately 110 m AOD. Gradients, in the north and south east, are generally moderate (2–6°), with a small area to the north west strongly sloping (8°). Westwards the land is generally level. Gradient is therefore only limiting where slopes of 8° restrict the land to Subgrade 3b quality.

15. A small field in the extreme south west of the site has a marked microrelief of ridge and furrow and hence has some abrupt changes of slope angle within an otherwise generally level field. This feature restricts parts of the field to a maximum ALC grade of 3a.

Geology and soils

16. The published 1:50 000 scale geology map for the area (British Geol. Survey, 1980) shows the site to consist predominantly of glacial sand and gravel. To the north a small area of Middle Lias Silts and Clays is mapped and in the centre of the site Lower Lias Clay is shown. In the south west a band of Alluvium is mapped.

17. The 1:250 000 scale reconnaissance soil survey map for the area (Soil Survey, 1983) shows soils of the Wickham 2 Association cover the whole site. These soils are briefly described as slowly permeable seasonally waterlogged fine loamy over clayey, fine silty over clayey and clayey soils with some areas of slowly permeable calcareous soils on steeper slopes.

18. An earlier more detailed 1:25 000 scale soil map (Soil Survey, 1978) shows the site to comprise five Soil Series. In the north and east on the top of the slopes the Sutton Series is mapped, on the lower slopes Oxpasture and Rowsham Series are shown and on the level ground in the valley to the south west of the site Wyre and Fladbury Series are mapped.

19. The Sutton Series is described as well drained with a possible restriction for plant growth due to droughtiness. The Oxpasture and Rowsham Series consist of well drained upper subsoils but are likely to have slowly permeable lower. The Wyre and Fladbury Series are described as poorly drained.

20. During the current, more detailed survey, three main soil types were identified which correspond broadly to the general findings contained on the published 1:25 000 scale soil survey map. These soil types are described briefly below, with more detail on their physical characteristics given in Appendix II.

Soil Type 1

21. These soils are associated with the higher land in the north and east of the site and consist of a very slightly or slightly stony medium sandy loam topsoil over a slightly stony medium sandy loam or sandy clay loam upper subsoil. Lower subsoils varied but generally comprised slightly or moderately stony medium sandy loam or sandy clay loams. At some of the sampling points it was not possible to auger below 60cms due to the dry field conditions at the time of survey. The profiles were well drained and assessed as Wetness Class I.

Soil Type II

22. This soil type is found on the lower slopes of the two main hills and in the south west corner of the site and consists of very slightly stony sandy clay loam or medium sandy loam topsoils overlying similar textured, but sometimes stonier, upper subsoils. The texture of the lower subsoil varied but was generally either a sandy clay loam or clay (with some sandy inclusions). Depending on the depth to evidence of wetness and/or a slowly permeable layer the wetness class was assessed as II or III.

Soil Type III

23. This soil type was found along the level land of the valley feature alongside the brook in the south west of the site. The topsoil typically consisted of medium clay loams or occasionally heavy clay loam or clays over mottled clay subsoils. Profiles were assessed as Wetness Class IV.

AGRICULTURAL LAND CLASSIFICATION

24. 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.

25. The location of the auger borings and pits is shown on the attached sample location map.

Grade 2

26. Land of Grade 2 quality is found in the north and west of the site associated with areas of *Soil Type I* and much of *Soil Type II*. For areas of *Soil Type I* relatively light textures and profile stone combine to reduce the available water for crop growth and impose a slight droughtiness limitation. Within areas of *Soil Type II* land quality may also be restricted by slight droughtiness but wetness/workability imperfections caused by ground water may be equally limiting (i.e. wetness class II). Occasional profiles of Grade 1 were found within this area but occurred too sporadically to be mapped separately.

Subgrade 3a

27. Land of this quality occurs in three small areas and is associated with *Soil Type II*. To the centre and south east lower subsoils are slowly permeable therefore, profiles have been assessed as Wetness Class III. This wetness class combines with the sandy clay loam topsoils to impose a moderate wetness/workability limitation restricting the land to Subgrade 3a (good quality agricultural land).

28. In the extreme south western corner of the site marked microrelief limits the use of some agricultural machinery and restricts the land to Subgrade 3a.

Subgrade 3b

29. Land of Subgrade 3b quality is associated with *Soil Type III* profiles. Subsoils are slowly permeable directly below the topsoil and have been assessed as Wetness Class IV. This wetness class and the fine textured topsoils combine with the prevailing climate to impose a significant wetness/workability limitation which restricts the land to Subgrade 3b (moderate quality agricultural land).

Resource Planning Team
Eastern Region
FRCA Cambridge

SOURCES OF REFERENCE

British Geological Survey (1980) *Sheet No.* 185, *Northampton*, Solid and Drift.
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 (1978) *Soils in Northamptonshire I. Sheet SP66 (Long Buckby)*
SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Sheet* 4, *Eastern England.*
SSEW: Harpenden.

APPENDIX I

DESCRIPTIONS OF THE GRADES AND SUBGRADES

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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

Soil Type 1 (23.7ha)

Topsoil

Texture	:	Medium sandy loam, occ. sandy clay loam
Colour	:	10YR4/3, 4/2, brown, dark greyish brown
Stones	:	Very slightly to slightly stony (typically 5%)
Roots	:	Common fine and very fine
Calcium carbonate	:	Occasionally calcareous
Boundary	:	Abrupt, smooth
Depth	:	27 cm

Upper Subsoil

Texture	:	Medium sandy loam or sandy clay loam
Colour	:	10YR4/6, dark yellowish brown
Mottles	:	None
Stones	:	Slightly stony (typically 10%)
Structure	:	Weakly developed medium and coarse subangular blocky
Consistence	:	Very friable
Structural condition	:	Good
Pores	:	>0.5% biopores
Roots	:	Common fine and very fine
Calcium carbonate	:	Occasionally calcareous
Boundary	:	Clear, smooth
Depth	:	62 cm

Lower Subsoil

Texture	:	Predominantly medium sandy loam or sandy clay loam but occasionally loamy coarse sand or medium sand
Colour	:	10YR5/6, 4/6, yellowish brown, dark yellowish brown
Mottles	:	None
Stones	:	Slightly to moderately stony
Structure	:	Coarser textures are single grain
Consistence	:	Loose
Structural condition	:	Moderate
Roots	:	Few fine and very fine
Calcium carbonate	:	Occasionally calcareous
Depth	:	120 cm

Wetness Class I

APPENDIX II (continued)

Soil Type II (15.8ha)

Topsoil

Texture	:	Sandy clay loam or medium sandy loam
Colour	:	10YR4/3, 4/2, brown, dark greyish brown
Stones	:	Very slightly stony (typically 3%)
Roots	:	Many fine and very fine
Calcium carbonate	:	Non calcareous
Boundary	:	Abrupt, smooth
Depth	:	26 cm

Upper Subsoil

Texture	:	Sandy clay loam
Colour	:	10YR5/3, 10YR5/6, brown, yellowish brown
Mottles	:	Common
Stones	:	Very slightly to slightly stony (typically 5%)
Structure	:	Weakly developed coarse subangular blocky
Consistence	:	Friable
Structural condition	:	Moderate
Pores	:	>0.5% biopores
Roots	:	Common fine and very fine
Calcium carbonate	:	Non calcareous
Depth	:	57 cm

Lower Subsoil

Texture	:	Sandy clay loam (SCL) or clay (C) with sandy inclusions
Colour	:	10YR5/3, 5/6, brown, yellowish brown (clay tended to be 2.5Y5/3, light olive brown)
Mottles	:	Many
Stones	:	Slightly stony (Typically 10%)
Structure	:	SCL - weakly developed coarse subangular blocky C - weakly developed coarse angular blocky
Consistence	:	SCL - friable C - firm
Structural condition	:	SCL - moderate C - poor
Pores	:	<0.5% biopores if C; >0.5% if SCL
Roots	:	Common fine and very fine
Calcium carbonate	:	Non calcareous
Depth	:	120 cm

Wetness Class : II or III (depending upon the depth at which there is evidence of wetness and/or a slowly permeable layer is encountered)

APPENDIX II (continued)

Soil Type III (16.7ha)

Topsoil

Texture	:	Medium clay loam occ. heavy clay loam or clay
Colour	:	10YR4/2, 4/3 , dark greyish brown, brown, occ. 7.5YR4/3, brown
Stones	:	Stoneless
Roots	:	Many fine and very fine (few coarse)
Calcium carbonate	:	Non calcareous
Boundary	:	Abrupt, smooth
Depth	:	22 cm

Upper Subsoil

Texture	:	Clay
Colour	:	10YR5/3, brown
Mottles	:	Many
Stones	:	Stoneless
Structure	:	Weakly developed coarse angular blocky
Consistence	:	Firm
Structural condition	:	Poor
Pores	:	<0.5% biopores
Roots	:	Common fine and very fine
Calcium carbonate	:	Non calcareous
Depth	:	58 cm

Lower Subsoil

Texture	:	Clay
Colour	:	2.5Y5/3, light olive brown
Mottles	:	Very many
Stones	:	Stoneless to slightly stony
Structure	:	Weakly developed coarse prismatic breaking to coarse angular blocky
Consistence	:	Firm
Structural condition	:	Poor
Pores	:	<0.5% biopores
Roots	:	Common fine and very fine
Calcium carbonate	:	Non calcareous
Depth	:	120 cm

Wetness Class : IV