FIRTREE LINK OCCS

Agricultural Land Classification (ALC) and Statement of Physical Characteristics Report

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Northern Region
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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

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INTRODUCTION

1. This report presents the findings of a detailed Statement of Physical Characteristics and Agricultural Land Classification (ALC) survey of 17.2 ha of land lying 500 m north of the village of Darfield in South Yorkshire.

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 the proposal to extract coal from the site by open cast methods.

3. The work was conducted by members of the Resource Planning Team in the Northern 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 on the site was in sugar beet or winter wheat. Other non-agricultural land on the site occurs in the centre and south and consists of derelict land associated with a disused railway line and previous mining activity (in the centre) and an active opencast mine (in the south).

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:5,000. 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
1			
2	3.5	57.4	20.3
3a			
3b	2.6	42.6	15.1
4			
5			
Agricultural land not surveyed			
Other land	11.1	N/A	64.6
Total surveyed area	6.1	100	-
Total site area	17.2	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 7 borings and 2 soil pits were described.

8. Grade 2, very good agricultural land, covers 3.5 ha. The soils are well or moderately well drained and consist of either fine sandy loam topsoils and subsoils overlying weathering sandstone at or below 70 cm depth (in which case soil droughtiness limits the land to Grade 2) or medium silty clay loam topsoils and medium or heavy silty clay loam upper subsoils overlying gleyed but sometimes slowly permeable heavy silty clay loam lower subsoils (in which case soil wetness is the grade-limiting factor).

9. Subgrade 3b, moderate quality agricultural land, covers 2.6 ha. Again, two main soil types occur. The first is well drained and consists of fine sandy loam topsoils and upper subsoils overlying weathering sandstone at around 45cm depth. The ALC grade of this land is limited by soil droughtiness. The second soil type is poorly drained and consists of heavy silty clay loam topsoils overlying gleyed and slowly permeable silty clay subsoils. In this case soil wetness is the grade-limiting factor.

10. Other land on this site covers 11.1 ha and consists of existing opencast coal workings, a disused railway line, and derelict land associated with previous mining activity.

11. In terms of soil resources two main soil types occur on this site. The first consists of sandy loam topsoils (median depth 25cm) and upper subsoils (mean depth 54cm) overlying weathering sandstone. The second soil consists of medium or heavy silty clay loam topsoils (median depth 35cm) and upper subsoils (mean depth 8cm) overlying heavy silty clay loam or silty clay lower subsoils (mean depth 78cm).

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	SE 423 053
Altitude	m, AOD	30
Accumulated Temperature	day°C (Jan-June)	1393
Average Annual Rainfall	mm	618
Field Capacity Days	days	135
Moisture Deficit, Wheat	mm	107
Moisture Deficit, Potatoes	mm	99
Overall climatic grade	N/A	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 (ATO, January to June), as a measure of the relative warmth of a locality.

16. The combination of rainfall and temperature at this site means that there is no overall climatic limitation of ALC grade.

Site

17. The agricultural land on the site is level in the west and south, but is gently to strongly sloping (2°- 8°) in the east. However only in one small area do the slopes exceed 7° (this area being limited to Subgrade 3b by its slope) and the ALC grade in other areas is not restricted. Neither flood risk nor microrelief are significant limitations on this site.

Geology and soils

18. The site is underlain by Carboniferous Middle Coal Measures. The soils on the agricultural land are derived from either weathering sandstone (on the higher ground in the east) or from river alluvium (in the west and south).

19. The soils on the site have been mapped as Conway and Brickfield 3 associations (Soils of England and Wales - Sheet 1). However, the field survey work found the soils to be more akin to the Conway and Rivington 1 associations, being derived from river alluvium and sandstone respectively.

AGRICULTURAL LAND CLASSIFICATION

20. 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.

Grade 2

21. Grade 2, very good quality agricultural land, is found in the west and south of the agricultural area. Two main soil types occur within this grade. The first consists of well drained (Wetness Class I) profiles derived from weathering sandstone. Typically very slightly stony fine sandy loam topsoils overlie very slightly or slightly stony fine sandy loam subsoils. Weathering sandstone occurs in places below 70cm depth. The ALC grade of this land is limited by very slight soil droughtiness. The second soil type consists of well or moderately well drained profiles (Wetness Classes I and II) derived from river alluvium. Typically medium silty clay loam topsoils overlie thin medium or heavy silty clay loam upper subsoils and, below 45cm depth, gleyed and sometimes slowly permeable heavy silty clay loam lower subsoils. The ALC grade in this case is limited by very slight soil wetness and by a pattern restriction which prevents Grade 1 profiles being mapped together as a separate unit.

Subgrade 3b.

22. Land in this subgrade, defined as moderate quality agricultural land, occurs in the east and south of the agricultural area. Again, two main soil types are found. The first consists of well drained (Wetness Class I) profiles consisting of fine sandy loam topsoils and subsoils overlying weathering sandstone at around 45cm depth. Soil droughtiness is the factor restricting this land to Subgrade 3b. The second soil type consists of poorly drained (Wetness Class IV) profiles in the far south of the agricultural area. Typically heavy silty clay loam topsoils overlie gleyed and slowly permeable silty clay subsoils at around 30cm depth. Soil wetness and topsoil workability restrictions are the grade-limiting factors in this case. In addition, an area of deep well drained soils is limited to Subgrade 3b by a slope of 8°.

Other land.

23. Other, non-agricultural, land on this site consists of existing opencast coal workings, a disused railway line, and derelict land associated with former colliery buildings and slurry ponds.

STATEMENT OF PHYSICAL CHARACTERISTICS.

24. Two main soil types were identified on the site, descriptions of which are given below. Topsoil and subsoil resources are shown on the accompanying maps along with soil thickness and volume information. Representative pit descriptions are given in Appendix II.

a) Soil Type 1 (T1/U1), light textured soil derived from weathering sandstone. This soil type occurs in the east of the agricultural area. It is characterised by its light texture, the absence of mottling, and often the presence of sandstone at depth.

b) Soil Type 2 (T2/U2/L1), medium to heavy-textured alluvial soil. This soil type occurs in the south and west of the agricultural area. It is characterised by the heavy-textured, mottled subsoil.

Topsoils.

25. Topsoil T1 occurs in the east of the agricultural area. It is light-textured, typically consisting of fine sandy loam, and very slightly to slightly stony, with between 3% and 12% very small to medium sandstones. Topsoil T1 has a weakly to moderately developed angular blocky and subangular blocky structure and a median thickness of 25cm.

26. Topsoil T2 occurs in the west and south of the agricultural area. It is medium to heavy-textured, consisting of medium or heavy silty clay loam, and very slightly stony, with around 3% very small sandstones. Topsoil T2 has a weakly developed angular blocky and subangular blocky structure and a median thickness of 35cm.

Upper Subsoils.

27. Upper subsoil U1 underlies topsoil T1. It is also light-textured (fine sandy loam) and very slightly to slightly stony, with between 3% and 15% very small to medium sandstones. This subsoil has a moderately developed medium angular blocky and subangular blocky structure. Its mean thickness is 54cm, the thickness being least on the higher ground in the east (often 20-25cm) and greatest in the west (up to 95cm). It is underlain by weathering sandstone.

28. Upper subsoil U2 underlies topsoil T2. It is medium to heavy-textured, consisting of medium silty clay loam or heavy silty clay loam, and it is stoneless to very slightly stony, containing up to 3% very small sandstones. This upper subsoil has a weakly developed medium prismatic structure and a mean thickness of 8cm.

Lower Subsoils.

29. Lower subsoil L1 underlies topsoil T2 and upper subsoil U2. It is heavy-textured (heavy silty clay loam or silty clay) and stoneless to very slightly stony, containing up to 3% very small to medium sandstones. This horizon has a moderately developed medium and coarse prismatic structure and a mean thickness of 78cm.

30. There are no significant soil resources in situ over the remainder of the site. The land in this area consists of existing opencast workings, derelict land associated with a disused railway line, and derelict land associated with former collier buildings and slurry ponds. In the event of a shortfall of soil, the materials in these areas (including overburden) may form suitable lower subsoil-forming material with which to restore a full profile depth.

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SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No. 87, Barnsley. 1:50,000 scale*
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 1, Soils of Northern England, 1:250,000 scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Northern 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

SOIL PROFILE DESCRIPTIONS

Soil Type 1: Light-textured soil derived from weathering sandstone (T1/U1/Sandstone)

Location: Grid Reference SE 421 056

Land Use: On field edge, not sown with any crop (bare ground)

Slope: 3° SW

Recent Weather: Cool and wet

Depth	Horizon Description
0-26	Very dark greyish brown (10YR 3/2) fine sandy loam; no mottles; slightly stony, containing approximately 7% very small to medium sandstones; slightly moist; compacted with a weakly developed coarse angular blocky structure; very firm; slightly porous; common very fine fibrous roots; slightly sticky; moderately plastic; non-calcareous; smooth abrupt boundary.
26-47	Yellowish brown (10YR 5/4) fine sandy loam; no mottles; slightly stony, with around 7% very small to medium sandstones; slightly moist; moderately developed medium subangular blocky structure; firm; very porous; common very fine fibrous roots; slightly sticky; moderately plastic, non-calcareous; smooth abrupt boundary.
47+	Weathering fine-grained sandstone.

Soil Type 2:	Medium to heavy-textured alluvial soil (T2/U2/L1)
Location:	Grid Reference SE 420 055
Land Use:	Sugar beet
Slope:	1° SW
Recent Weather:	Cool and wet

Depth	Horizon Description
0-37	Very dark greyish brown (10YR 3/2) medium silty clay loam; no mottles; very slightly stony, with around 3% very small sandstones; moist; weakly developed fine subangular blocky structure; firm; slightly porous; common very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
37-51	Brown (10YR 5/3) medium silty clay loam; few strong brown mottles (7.5YR 4/6); very slightly stony, with around 3% very small sandstones; moist; weakly developed medium prismatic structure; very firm; moderately porous (>0.5% pores > 0.5mm); common very fine fibrous roots; moderately sticky; moderately plastic, non-calcareous; gradual smooth boundary.
51-120	Greyish brown (2.5YR 5/2) heavy silty clay loam; many strong brown (7.5YR 4/6 and 7.5YR 5/8) mottles; very slightly stony, containing around 3% very small to medium sandstones; moist; moderately developed medium and coarse prismatic structure; very firm; moderately porous (1-2% pores > 0.5mm); few very fine fibrous roots; moderately sticky; moderately plastic, non-calcareous.