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

**May 1997**

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Northern Region  
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**RPT Job Number: 20/97  
MAFF Reference: EL 11221  
LURET Job Number: ME3 RMD9**

*RPT 20, 172*

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AGRICULTURAL LAND CLASSIFICATION AND  
STATEMENT OF PHYSICAL CHARACTERISTICS REPORT**

**INTRODUCTION**

1. This report presents the findings of a detailed Statement of Physical Characteristics and Agricultural Land Classification (ALC) survey of 20.1 ha of land south-west of the village of West Bretton in West Yorkshire. The survey work was carried out in May 1997.
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 by opencasting from the site. This ALC survey supersedes any previous ALC surveys.
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 under ley grass in the north, in the far south and in the south-eastern corner. The remainder of the agricultural land was sown to winter wheat. Non-agricultural land on the site occurs in the centre (deciduous woodland) and in the north-east (hawthorn scrub).

**SUMMARY**

5. The findings of the survey are shown on the enclosed ALC and soil resource maps. The maps have been drawn at a scale of 1:5,000. They are 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			
3a			
3b	13.1	69.3	65.2
4	5.8	30.7	28.8
5			
Agricultural land not surveyed		N/A	
Other land	1.2	N/A	6.0
Total surveyed area	18.9	100	-
Total site area	20.1	-	100

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

8. Subgrade 3b, moderate quality agricultural land, occurs in the north, centre, and far south of the site. The soils are poorly drained, with medium silty clay loam and medium clay loam topsoils overlying thin medium silty clay loam, medium clay loam, heavy clay loam or heavy silty clay loam upper subsoils and heavy clay loam, heavy silty clay loam or silty clay lower subsoils in most cases. The lower subsoils are gleyed and slowly permeable, as are the upper subsoils in places, and the ALC grade is limited by soil wetness. In an area in the centre of the site medium clay loam or medium silty clay loam topsoils overlie colliery overburden at between 20cm and 35cm depth. Soil wetness is also the grade limiting factor in this case.

9. Grade 4, poor quality agricultural land, occurs in the south of the site. Again the soils are poorly drained, in this case with heavy clay loam or heavy silty clay loam topsoils and thin upper subsoils overlying gleyed and slowly permeable silty clay within 40cm depth. A combination of soil wetness and topsoil workability limitations are the factors restricting this land to Grade 4.

10. In terms of soil resources, two main soil types occur on the site. The first consists of disturbed soils in the centre where medium-textured topsoils (median thickness 20cm) overlie colliery overburden. The second soil type covers the remainder of the site. This soil type consists of either a medium-textured topsoil (median thickness 20cm) or a heavy-textured topsoil (median thickness 25cm) overlying a medium to heavy textured upper subsoil (mean thickness 16cm) and a heavy-textured lower subsoil (mean thickness 71cm). Weathering sandstone begins at a mean depth of 110cm.

## FACTORS INFLUENCING ALC GRADE

### Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.
12. 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	
Grid reference	N/A	SE 272 128
Altitude	m, AOD	93
Accumulated Temperature	day°C (Jan-June)	1322
Average Annual Rainfall	mm	691
Field Capacity Days	days	176
Moisture Deficit, Wheat	mm	95
Moisture Deficit, Potatoes	mm	82
Overall climatic grade	N/A	Grade 1

13. 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.
14. 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.
15. The combination of rainfall and temperature at this site means that there is no overall climatic limitation of ALC grade.

### Site

16. The land varies between level and very steeply sloping (0-26°). The steepest land is not in agricultural use but some areas of the northernmost field are limited to Subgrade 3b by slopes of 8-10°. Neither microrelief nor flood risk are of significance on this site.

### Geology and soils

17. The site is underlain by Carboniferous Coal Measures consisting of interbedded sandstones and shales. With the exception of locally derived Head deposits there is no drift cover (BGS sheets 78 and 87) and the soils are derived from weathering shale in most cases. In a small area in the centre of the site the soils have been disturbed and colliery overburden directly underlies the topsoil.

18. The soils have been mapped as Dale association by the Soil Survey and Land Research Centre. The field survey work confirmed the presence of Dale association soils as well as some disturbed soils in the centre of the site.

### **AGRICULTURAL LAND CLASSIFICATION**

19. 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.

#### **Subgrade 3b.**

20. Land in this subgrade, defined as moderate quality agricultural land, occurs in the north, centre and far south of the site. The soils are poorly drained, falling in Wetness Class IV. Typically medium clay or medium silty clay loam topsoils overlie thin medium clay loam, medium silty clay loam, heavy clay loam or heavy silty clay loam upper subsoils and heavy clay loam, heavy silty clay loam or silty clay lower subsoils. The subsoils typically become gleyed and slowly permeable at around 30cm depth and soil wetness is the factor which limits this land to Subgrade 3b. In a small area in the centre of the site there are disturbed soils consisting of medium clay loam or medium silty clay loam topsoils overlying slowly permeable colliery overburden at between 20cm and 35cm depth. Soil wetness is also the grade limiting factor in this case.

#### **Grade 4.**

21. Grade 4, poor quality agricultural land, occurs in the south of the site. The soils are similar to the undisturbed Subgrade 3b land, being poorly drained, but the topsoils consist of heavy clay loam or heavy silty clay loam. This gives an additional topsoil workability limitation which further restricts the ALC grade of the land to Grade 4.

#### **Other land.**

22. Other land on this site occurs in the north-east (hawthorn scrub) and in the centre (a deciduous plantation).

### **Statement of Physical Characteristics.**

23. 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/Overburden), Disturbed soil.

This soil type occurs in the centre of the site and consists of a medium-textured topsoil overlying colliery overburden which was probably associated with the former colliery to the west.

b) Soil Type 2. (T1 or T2/U1/L1), Medium to heavy-textured soil.

This soil type occurs over the remainder of the site. It is undisturbed and consists of a medium to heavy-textured topsoil and upper subsoil overlying a heavy-textured lower subsoil.

### **Topsoils**

24. Topsoil T1 occurs in the north, centre and far south of the site. It is medium-textured, consisting of medium clay loam or medium silty clay loam, and stoneless to slightly stony, containing 0-7% very small to medium sandstones and fragments of shale. Unit T1 has a weakly to moderately developed subangular blocky structure and a median thickness of 20cm.

25. Topsoil T2 occurs in the south of the site. It is very similar to Unit T1 but is heavy-textured (heavy clay loam or heavy silty clay loam). The median unit thickness of topsoil T2 is 25cm.

### **Upper Subsoils.**

26. Upper Subsoil U1 occurs over the whole site with the exception of a small area in the centre, where colliery overburden underlies the topsoil. Unit U1 is medium to heavy-textured, consisting of medium clay loam, medium silty clay loam, heavy clay loam or heavy silty clay loam. It is stoneless to very slightly stony, containing 0-5% very small to medium sandstones and fragments of shale, and has a weakly developed coarse angular blocky structure. It's mean thickness is 16cm.

### **Lower Subsoils.**

27. Lower Subsoil L1 underlies Upper Subsoil U1. It is heavy-textured, consisting of heavy clay loam, heavy silty clay loam or silty clay. It is stoneless to slightly stony, containing 0-8% very small to medium sandstones and fragments of shale. It has a weakly developed course subangular blocky and medium prismatic structure and a mean thickness of 71cm.

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## SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No.87. Barnsley (Solid and Drift). 1:50,000 scale*  
BGS: London.

British Geological Survey (1972) *Sheet No.78. Wakefield (Drift). 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 DESCRIPTION

Soil Type 1: Disturbed Soil (T1/Overburden)

Location: Grid Reference SE 2718 1280

Land Use: Ley grassland

Slope: 2°E

Recent Weather: Bright and mild after recent rain

Depth (cm)	Horizon Description
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0-21	Dark greyish brown (10YR 4/2) medium silty clay loam; no mottles but common ochreous root channels; slightly stony, containing approximately 10% total very small to large angular shales; moist; moderately developed medium and coarse subangular blocky structure; firm; slightly porous; many fine and very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear, smooth boundary
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21+	Dark grey (N4/) colliery overburden consisting of approximately 40% very small to large angular shales and 60% silty clay; common brownish yellow (10YR 6/6) mottles; slightly moist; weakly developed coarse platy structure; extremely firm; very slightly porous (<0.5% pores > 0.5mm); common fine and very fine fibrous roots; moderately sticky; very plastic; non-calcareous.
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Soil Type 2: Medium to heavy-textured soil (T1/U1/L1)

Location: Grid Reference SE 2720 1240

Land Use: Ley grassland

Slope: 0°

Recent weather: Bright and mild after recent rain

**Depth (cm)                      Horizon Description**

0-24                              Very dark greyish brown (10YR 3/2) medium silty clay loam; no mottles; stoneless; moist; weakly to moderately developed fine and medium subangular blocky structure; firm; slightly porous; many very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.

24-34                             Brown (10 YR 5/3) heavy clay loam; few diffuse strong brown (7.5 YR 4/6) mottles; stoneless; moist; weakly developed coarse angular blocky structure; very firm; slightly porous (<0.5% pores > 0.5mm); common very fine fibrous roots; moderately sticky; very plastic; non-calcareous; clear smooth boundary.

34-120                            Light brownish grey (2.5 Y 6/2) silty clay; many distinct yellowish red (7.5 YR 6/8) mottles; very slightly stony, containing approximately 3% shales as well as common very small to medium sized concretions of manganese; moist; weakly developed coarse subangular blocky and medium prismatic structure; very firm; very slightly porous (<0.5% pores > 0.5mm); common very fine fibrous roots, few below 50cm; moderately sticky; very plastic; non-calcareous.