

**Studley House OCCS
Hemsworth
West Yorkshire
Agricultural Land Classification and
Statement of Physical Characteristics
Report
July 1996**

**Resource Planning Team
Leeds Statutory Group
ADAS Leeds**

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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

STUDLEY HOUSE OCCS, HEMSWORTH, WEST YORKSHIRE

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 12.2 ha of land at Studley House, Hemsworth. The survey was carried out in July 1996.
2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Northallerton in connection with the application to extract coal from the site by opencasting. This survey supersedes a previous ALC survey on this land for the Hemsworth bypass in May 1990 (2FCS 4776, Job No: 12/90).
3. The work was conducted by members of the Resource Planning Team in the Leeds Statutory Group in ADAS. 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 spring cereals north of Royd Moor Lane, and winter cereals south of this. Other land consists of a metalled road running east to west.

Summary

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:5000. 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)	% Total site area	% Surveyed Area
3a	3.5	28.7	29.2
3b	8.5	69.7	70.8
Other Land	0.2	1.6	-
Total surveyed area	12.0	-	100
Total site area	12.2	100	-

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

8. Subgrade 3a, good quality agricultural land, occurs in the north-east and south of the site. Generally soils are imperfectly drained, and consist of medium clay loam topsoils, over similar upper subsoils, in turn over slowly permeable clay lower subsoils. This land is limited to Subgrade 3a by a slight soil wetness restriction.

Subgrade 3b, moderate quality land, occurs over the remaining agricultural land. Soils in the west and south-west consist of medium clay loam topsoils over shallow sandy loam subsoils, over sandstone bedrock. These areas are limited to Subgrade 3b by moderate soil droughtiness restrictions. Remaining land within Subgrade 3b consists of medium clay loam topsoils over gleyed slowly permeable clay subsoils. These soils are poorly drained, and are limited to this subgrade by moderate soil wetness restrictions.

Other land consists of a metalled road running east to west through the site.

9. In terms of soil resources two main soil types occur on this site. The first consists of medium-textured topsoils over medium/heavy textured subsoils (T1/S1), where medium textured topsoils (median depth 30 cm) overlie medium to heavy-textured subsoils (mean depth 90 cm). The second main soil type consists of medium textured topsoils (median depth 30 cm) overlying shallow light textured subsoils (mean depth 10 cm), (T1/S2) in turn over sandstone bedrock.

Factors Influencing ALC Grade

Climate

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

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

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SE 440140
Altitude	m, AOD	65
Accumulated Temperature	day°C (Jan-June)	1349
Average Annual Rainfall	mm	654
Field Capacity Days	days	141
Moisture Deficit, Wheat	mm	100
Moisture Deficit, Potatoes	mm	89

12. 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.

13. 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.

14. There is no climatic limitation on this site.

Site

15. This site is level to gently sloping (0 - 2°) and at no point does the gradient limit the ALC grade. There are also no micro-relief or flood limitations on this site.

Geology and soils

16. The published geology map for the area (Sheet 78, Wakefield, 1:50000, 1978), show that Carboniferous Coal Measures consisting of interbedded shales and sandstones cover this area.

17. The Soils of England and Wales (Sheet 1, Northern England, 1:250000 scale) shows the soils on the site to be of the Bardsey association.

Agricultural Land Classification

18. 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.

Subgrade 3a

19. Subgrade 3a, good quality agricultural land, occurs in the north east and south of the site. The soils are imperfectly drained, falling into Wetness Class III (see Appendix II), and typically consists of very slightly stony (1 - 2% small and medium sandstones), medium clay loam topsoils, over similar permeable, slightly mottled upper subsoils, in turn over gleyed slowly permeable clay lower subsoils. The slowly permeable layer occurs at 45 cm depth. Slight soil wetness limits this land to Subgrade 3a. This limitation restricts the flexibility of the land, reducing the range of high yielding crops which can be grown, and also reduces the number of days in the year when the soils are in a suitable condition for cultivations and trafficking by machinery.

Subgrade 3b

20. Remaining agricultural land falls into Subgrade 3b moderate quality agricultural land. Two small areas of well drained, Wetness Class I (see Appendix II), land occur in the west and south-west of the site. Soils consists of very slightly stony (1 - 3% small and medium sandstones), medium clay loam topsoils, overlying very slightly stony (2 - 4% small and medium sandstones) medium sandy loam subsoils. Hard sandstone bedrock occurs between 40 cm and 45 cm depth. The ALC grade of this land is limited by moderate soil droughtiness restrictions which means the land is only capable of producing moderate yields of a narrow range of crops or lower yields of a wider range of crops. The rest of the agricultural land is poorly drained, falling into Wetness Class IV (see Appendix II). Soil consist of stoneless to very slightly stony medium clay loam topsoils over stoneless, gleyed, slowly permeable clay subsoils. The slowly permeable layer occurs between 25 cm and 35 cm depth. These soils are limited to this subgrade by moderate soil wetness restrictions, which means only moderate yields of a narrow range of crops, or lower yields of a wider range of crops can be produced. Flexibility is also reduced as the period of the year when soils are in a suitable condition for cultivation is restricted.

Other land

21. Other land consists of a metalled road running east to west through site.

Statement of Physical Characteristics

22. Two main soil types are found on this site, descriptions of which are given below. Topsoil and subsoil resources are shown on the accompanying maps along with soil thickness and volume information.

a. Soil Type 1, Medium-textured soils overlying medium and heavy textured subsoils (T1/S1)

23. This soil type occurs over the majority of the site, apart from two small areas in the west and south-west of the site, and is derived from shales of the Coal Measures. It is characterised by a medium-textured topsoil overlying a medium-to heavy textured subsoil.

b. Soil Type 2, Medium-textured soils overlying shallow light textured subsoils, (T1/S2).

It is derived from the sandstones of the Coal Measures and is characterised by a medium-textured topsoil overlying a light textured subsoil, itself lying over hard sandstone bedrock.

Soil Resources

Topsoil

24. Unit T1 occurs over the whole of the site. It is generally medium textured (medium clay loam with occasional sandy clay loam) and very slightly stony, with 1 - 4% small and medium sandstones. It has a moderately developed coarse subangular blocky structure and a mean depth of 30 cm.

Subsoils

25. Unit S1 underlies topsoil T1. It is stoneless to very slightly stony with 1 - 2% small and medium sandstones, medium to heavy-textured, consisting of medium clay loam, heavy clay loam and clay. This subsoil has a mainly well developed coarse prismatic structure and a mean unit depth of 90 cm.

26. Unit S2 also underlies topsoil, T1. It is very slightly stony with 2 - 3% small sandstones, and light textured, consisting of medium sandy loam. This subsoil has a moderately developed medium angular blocky structure and a mean unit depth of 10 cm.

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SOURCES OF REFERENCE

British Geological Survey (1978) *Sheet No. 78, Wakefield. (1:50,000, 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 (1983) *Soils and their Use in Northern England (1:250,000)*
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 WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging ¹
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years. ²
II	The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

¹ The number of days is not necessarily a continuous period.

² 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

APPENDIX III

Representative Profile Descriptions

Soil Type 1: Medium-textured soils over medium to heavy textured soils (T1/S1), Pit 1.

Location: Near boring 5.

Land Use: Winter Cereals.

Slope: 0°

Depth (cm)	Horizon description
0 - 24	Very dark greyish brown (10YR3/2) medium clay loam; no mottles; stoneless; slightly moist; moderately developed coarse subangular blocky structure; friable; >0.5% biopores >0.5 mm; many fine and medium fibrous roots; moderately sticky; moderately plastic; non-calcareous; abrupt smooth boundary.
24 - 120	Grey (10YR5/1) clay; many distinct brownish yellow (10YR6/8) mottles; stoneless; slightly moist; well developed coarse prismatic structure; very firm; <0.5% biopores >0.5 mm; very sticky; very plastic; non-calcareous.

Soil Type 2: Medium textured over light textured (T1/S1 Pit 2)

Location: Near boring 7.

Land Use: Winter Cereals

Slope: 2° West.

Depth (cm)	Horizon description
0 - 30	Very dark greyish brown (10YR3/2), sandy clay loam; no mottles; very slightly stony, with 2% total small sandstones; dry; moderately developed medium subangular blocky structure; friable; >0.5% biopores <0.5 mm; many fine and medium fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear smooth boundary.
30 - 41	Dark yellowish brown (10YR4/4), medium sandy loam; very slightly stony with 2-3% total small sandstones; dry; moderately developed medium angular blocky structure; >0.5% biopores >0.5 mm; slightly sticky; slightly plastic; non-calcareous.
41+	Hard sandstone bedrock.