



**HOLLOW BANKS, SCORTON
NORTH YORKSHIRE**

**Agricultural Land Classification and
Statement of Physical Characteristics Report
February 1997**

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

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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 15.4 ha of land at Catterick Bridge, near Scorton. The survey was carried out during February 1997.
2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Northallerton in connection with the proposal to extract sand and gravel from this land. The north of the site had been subject to an ALC survey in 1991 which found all of the agricultural land to be Grade 2 (Ref. 58/91) but more detailed assessment of the topsoil stone content during the February 1997 survey found that most profiles are in fact limited to Subgrade 3b by topsoil stoniness.
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 the 1997 survey the land on the site was mainly under cereal stubble or had recently been ploughed. Non-agricultural land on the site includes a belt of recently felled trees north of Howe Hill Lane and Howe Hill Lane itself, and part of a sewage works close to the River Swale.

Summary

5. The findings of the survey are shown on the enclosed ALC and topsoil/subsoil 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)	% Total site area	% Surveyed Area
Grade 2	3.9	25.3	26.7
Subgrade 3b	10.7	69.5	73.3
Other land	0.8	5.2	-
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Total surveyed area	14.6	-	100
Total site area	15.4	100	-

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

8. Grade 2, very good quality agricultural land, covers 3.9 ha. The soils are well drained and consist of slightly stony medium sandy loam topsoils and upper subsoils overlying very to extremely stony medium sandy loam lower subsoils. The ALC grade of this land is limited by soil droughtiness, flood risk, and, in places, topsoil stoniness.

9. Subgrade 3b, moderate quality agricultural land, covers the remainder of the agricultural land. In the north and in the south-eastern corner the soils are similar to those on the Grade 2 land but the topsoils are moderately to very stony and the subsoils are very to extremely stony. Most of this land is limited to Subgrade 3b by topsoil stoniness and soil droughtiness. Although some profiles meet the requirements for Subgrade 3a a pattern limitation prevents their being mapped as a separate unit. The remaining Subgrade 3b land lies close to the River Swale. Although the soils meet the physical requirements for Grade 2, they contain elevated levels of lead, zinc and cadmium. This land should not be used to grow crops for direct human consumption and is, therefore, limited to Subgrade 3b.

10. Other land on this site consists of a belt of recently-felled trees, Howe Hill Lane, and part of a sewage works.

11. In terms of soil resources, two main soil types were identified. The first consists of moderately to very stony sandy loam topsoils (median depth 30 cm) overlying very to extremely stony sandy loam subsoils (mean depth 88 cm). The second consists of slightly stony sandy loam topsoils (median depth 30 cm) overlying slightly stony sandy loam upper subsoils (mean depth 47 cm) and very to extremely stony sandy loam lower subsoils (mean depth 42 cm). The topsoils and possibly the subsoils lying closest to the River Swale have elevated levels of lead, zinc and cadmium and care should be taken to avoid mixing these soils with uncontaminated soil.

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	SE230 997
Altitude	m, AOD	60
Accumulated Temperature	day°C (Jan-June)	1332
Average Annual Rainfall	mm	709
Field Capacity Days	days	179
Moisture Deficit, Wheat	mm	97
Moisture Deficit, Potatoes	mm	84

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 means that there is no overall climatic limitation of ALC grade.

Site

17. The land on the site is generally level (0-1°) but a moderately to moderately steeply sloping bank occurs in the centre of the site. However, none of the slopes on the agricultural land are greater than 7° and as such gradient does not limit ALC grade at any point. Microrelief is not significant on this site but land adjacent to the River Swale is subject to periodic flooding which limits its ALC grade to 3b at best. Land more distant from the river will flood less frequently but is still limited to Grade 2 by flood risk. Land above the belt of trees is not prone to flooding.

Geology and soils

18. This site is underlain by Millstone Grit over which lie deep deposits of alluvium (in the south) and undifferentiated river terrace (over the remainder of the site). BGS, Sheet 41, Richmond.

19. The soils on the site have been mapped as Wick 1 association by the Soil Survey of England and Wales (Soils of England and Wales, Sheet 1).

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.

Grade 2

21. Grade 2, very good quality agricultural land, occurs in the centre of the site adjoining Howe Hill Lane. The profiles are well drained, falling in Wetness Class I (see Appendix II), and consist of medium sandy loam topsoils and subsoils. The topsoils and upper subsoils are slightly stony, containing around 8 - 15% total stones of mixed lithology (3-10% greater than 2 cm in size) whilst the lower subsoils are very stony to extremely stony, containing around 70% stones of mixed lithology. The ALC grade of this land is limited by soil droughtiness, flood risk and , in many areas, topsoil stoniness.

Subgrade 3b

22. The remainder of the agricultural land on the site falls in Subgrade 3b, moderate quality land. In the north of the site and in a small corner in the south-east, the soils are well drained (Wetness Class I) with medium sandy loam topsoils and subsoils. The topsoils are moderately to very stony, containing between 20% and 40% stones of mixed lithology (10 - 22% greater than 2 cm in size), whilst the subsoils are very to extremely stony, containing 65% to 75% stones of mixed lithology. Most of the land in this area is limited to Subgrade 3b by soil droughtiness and topsoil stoniness. Although some profiles meet the requirements for Subgrade 3a they do not form a discrete unit and a pattern limitation therefore restricts these areas to Subgrade 3b.

Alongside the River Swale the soils are also well drained (Wetness Class I) with medium sandy loam topsoils and subsoils. The topsoils are very slightly to slightly stony, with 4% to 8% total stones (2% to 4% greater than 2 cm in size), and the subsoils are very slightly to slightly stony, containing between 5% and 15% stones of mixed lithology. Because this area has been subject to periodic flooding the levels of lead, zinc and cadmium (metals associated with lead mining upstream) exceed Department of Environment toxic threshold levels by an appreciable margin. Land contaminated in this way should not be used to grow crops for direct human consumption. Its flexibility is therefore much reduced and it is limited to Subgrade 3b for that reason.

Other Land

23. Other, non-agricultural, land on this site consists of a belt of recently felled trees north of Howe Hill Lane, Howe Hill Lane itself, and part of a sewage works close to the River Swale.

Statement of Physical Characteristics

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

- a) Soil Type 1 (T1/S1), Moderately to extremely stony light-textured soil.

This soil type occurs in the north of the site and in the south-eastern corner. It is characterised by a moderately to very stony topsoil and a very to extremely stony subsoil.

- b) Soil Type 2 (T2/U1/L1), Slightly to extremely stony light-textured soil.

This soil type occurs in the south of the site. It is characterised by slightly stony topsoils and upper subsoils overlying very to extremely stony lower subsoils.

Soil Resources

Topsoils

Unit T1 occurs in the north of the site and in the south-eastern corner. It is light-textured (generally medium sandy loam) and moderately to very stony, with between 20% and 40% stones of mixed lithology. Unit T1 has a weakly developed fine and medium subangular blocky structure and a median unit depth of 30 cm.

Unit T2 occurs in the south of the site, and also consists of medium sandy loam in most cases. However, it is only slightly stony, containing between 8% and 15% stones of mixed lithology which vary in size from very small to large. Unit T2 has a moderately developed medium and coarse subangular blocky structure and a median depth of 30 cm. It should be noted that the T2 soils nearest to the River Swale have raised levels of lead, zinc and cadmium and that this factor should be considered in any plans to use these soils in any subsequent restoration.

Upper/Whole Subsoils

Upper subsoil U1 underlies topsoil T2 in the south of the site. It is light-textured (typically medium sandy loam) and slightly stony, containing between 8% and 15% very small to large stones of mixed lithology. Unit U1 has a strongly developed coarse angular blocky structure and a mean depth of 47 cm.

Whole subsoil S1 underlies topsoil T1 in the north and in the south-eastern corner. It is light-textured (generally medium sandy loam) and very to extremely stony, containing around 70% very small to large stones of mixed lithology. Unit S1 has a weakly to moderately developed fine and medium subangular blocky structure and a mean depth of 88 cm.

Lower Subsoils

Lower subsoil L1 underlies topsoil T2 and upper subsoil U1 in the south. It consists of medium sandy loam and it is very to extremely stony, containing approximately 70% very small to large stones of mixed lithology. Unit L1 has a moderately developed medium granular structure and a mean depth of 42 cm.

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SOURCES OF REFERENCE

British Geological Survey (1970) *Sheet No. 41, Richmond., 1:63,360 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

Resource Planning Group (1991). *Agricultural Land Classification, Richmondshire Local Plan.Reference 58/91. Resource Planning Group, Leeds.*

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 PROFILE DESCRIPTION

Soil Type 1: Moderately to extremely strong light-textured soil (T1/S1)

Location: Grid Reference SE 228 997

Land Use: Recently ploughed.

Slope: 2° S.

Recent Weather: Mild and windy after recent rain.

Depth(cm)	Horizon Description
0 - 34	Dark brown (10YR3/3) medium sandy loam; no mottles; moderately stony, with 30% total very small to large stones of mixed lithology (13% greater than 2 cm in size); moist; weakly developed fine and medium subangular blocky structure; firm; very porous; common very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear smooth boundary.
34 - 120	Brown/dark brown (7.5YR4/3) medium sandy loam; no mottles; very stony, with 65% very small to large stones of mixed lithology; moist; weakly to moderately developed fine and medium subangular blocky structure; firm; very porous; common very fine fibrous roots; slightly sticky; slightly plastic; non calcareous.

Soil Type 2: Slightly to extremely stony light-textured soil (T1/U1/L1)

Location: Grid Reference SE 231 997

Land Use: Cereal stubble.

Slope: 0°

Recent Weather: Mild and windy after recent rain.

Depth(cm)	Horizon Description
0 - 31	Brown/dark brown (10YR4/3) medium sandy loam; no mottles; slightly stony, with approximately 10% very small to large hard stones (2% greater than 2 cm in size); moist; moderately developed medium and coarse subangular blocky structure; friable; very porous; common very fine, fine and medium fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear smooth boundary.
31 - 70	Yellowish brown (10YR5/4) medium sandy loam; no mottles; slightly stony, with approximately 10% very small to large hard stones; moist; strongly developed coarse angular blocky structure; firm; very porous; common very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear, smooth boundary.
70 - 120	Dark yellowish brown (10YR4/4) medium sandy loam; no mottles; extremely stony, containing approximately 70% very small to large hard stones; moist; moderately developed medium granular structure; friable; very porous; few very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous.