THRISLINGTON QUARRY
COUNTY DURHAM

Agricultural Land Classification and Statement of Physical Characteristics Report

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Resource Planning Team
Northern Region
FRCA, Leeds

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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

THRISLINGTON QUARRY COUNTY DURHAM

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) and Statement of Physical Characteristics survey of 12.1 ha of land at Thrislington Quarry. The survey work was carried out in September 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 a proposal to extend the existing limestone quarry.

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 land to the west of the disused road had recently been cultivated and to the east the land was under cereal stubble.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC and topsoil/subsoil maps. 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			
3a	4.4	38.6	36.4
3b	7.0	61.4	57.8
4			
5			
Agricultural land not surveyed		N/A	
Other land	0.7	N/A	5.8
Total surveyed area	11.4	100	-
Total site area	12.1	-	100

7. The fieldwork was conducted at an average density of one boring per hectare. A total of 14 borings and 3 soil pits were dug.

8. Two areas of Subgrade 3a land were mapped on the site. Mostly soils were relatively shallow with weathering limestone bedrock encountered at about 55 cm depth. This land is subject to a droughtiness limitation. A small part of the north of the site contains deeper soils derived from a reddish brown clayey material, probably a mudstone which is commonly associated with Magnesian Limestone. These soils are slowly permeable at about 45 cm depth and the land is limited to this subgrade by soil wetness and workability problems.

9. Remaining agricultural land is all Subgrade 3b. Soils are very shallow and stony. Limestone bedrock is usually exposed within 35 cm depth. These soils have a low water holding capacity and the land is limited to 3b on droughtiness.

10. Other land on this site comprises the disused road that crosses the site.

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 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	NZ 322 329
Altitude	m, AOD	135
Accumulated Temperature	day°C (Jan-June)	1220
Average Annual Rainfall	mm	688
Field Capacity Days	days	175
Moisture Deficit, Wheat	mm	85
Moisture Deficit, Potatoes	mm	69
Overall climatic grade	N/A	Grade 2

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

15. The combination of rainfall and temperature at this site means there is an overall climatic limitation on the site of Grade 2.

Site

16. The site has a north to north westerly aspect with slopes of about 2° to 3°. Average altitude is 135 m AOD.

Geology and soils

17. The site is underlain by Magnesian Limestone with occasional pockets of associated mudstone. Drift cover is absent and weathering limestone usually occurs within 35 to 65 cm depth. The depth of soil profiles is variable as is typical for these types of soils. The soils on the site have been mapped as Aberford association by the Soil Survey of England and Wales (Sheet 1).

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. Two areas of Subgrade 3a land were mapped on the site. Except in the extreme north of the site soils comprise a medium clay loam or medium silty clay loam topsoil over a similar textured or occasionally heavy clay loam subsoil. Topsoils are very slightly to moderately stony, subsoils generally moderately stony. Profiles are well drained falling into Wetness Class I but weathering Magnesian Limestone is encountered at about 55 cm depth. This reduces the available water capacity of the soil and the land is limited to Subgrade 3a by soil droughtiness.

20. A small area of land in the extreme north of the site contains soils developed upon weathering mudstone deposits, typically found within the limestone. Profiles are slowly permeable at about 45 cm depth and soil wetness limits the land to Subgrade 3a.

Subgrade 3b

21. All land within this subgrade contains very shallow and often stony soils over weathering limestone at about 35 cm depth. Droughtiness and occasionally topsoil stoniness limit the grade of this land.

Other land

22. This comprises the disused road that crosses the site.

STATEMENT OF PHYSICAL CHARACTERISTICS

One main soil type was identified on the site, a description of which is 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/S1), medium textured soil derived from limestone

This soil type occurs over the whole site except for the disused road which crosses the site where there is no soil resource. It contains a medium textured topsoil and where present a similar textured subsoil. Weathering bedrock occurs at between 35 and 120 cm depth.

Topsoils

Topsoil T1 covers the whole site and is medium textured and very slightly to moderately stony with a strongly or moderately developed structure. This unit has a mean thickness of 30 cm.

Subsoils

Over much of the site topsoils directly overlie bedrock or subsoils are very thin (less than 10 cm) (see pit 2 Appendix II). However, a small area in the south of the site and land in the north contains identifiable subsoil resources. Generally, S1 comprises a medium or occasionally a heavy textured soil with few to many limestones. The structure is moderately developed and the unit has a mean thickness of 25 cm (see pit 3 Appendix II).

A small part of the site in the extreme north contains deeper subsoils which are derived from mudstone. These subsoils tend to be poorly structured and clayey (heavy textured) below 50 cm depth. However, auger boring evidence suggests this unit is both too small and patchy to be identified as a separate unit. A description of this soil type is given in pit 1 at Appendix II.

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SOURCES OF REFERENCE

British Geological Survey (1965) *Sheet No.24, Durham, 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

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

PIT 1

Profile Pit at:	B1 (see map)
Land Use:	Cereal Stubble
Slope and Aspect:	Level
Recent Weather:	Dry and sunny

Horizon depth

0-27 cm	10 YR 4/2, dark greyish brown; medium clay loam; 5% limestones (3% >2 cm); moist; moderately developed medium subangular blocky; friable; >0.5% biopores; common fine fibrous roots; gradual wavy boundary.
27-46 cm	7.5 YR 5/2, brown; unmottled; heavy clay loam; stoneless; moist moderately developed coarse angular blocky; firm; <0.5% biopores; few fine fibrous roots; gradual smooth boundary.
46-120 cm	7.5 YR 5/1, grey, ped faces with few distinct 10 YR 6/6 reddish yellow mottles and few manganese concretions; clay; stoneless; moist; moderately developed coarse angular blocky; firm; <0.5% biopores; few fine fibrous roots.

PIT 2

Profile Pit at:	B12 (see map)
Land Use:	Recently cultivated
Slope and Aspect:	1° NW
Recent Weather:	Dry and sunny

Horizon depth

0-25 cm	7.5 YR 3/2, dark brown; unmottled; medium clay loam; 16% limestones (12% >2 cm 5% >6 cm); moist; moderately developed medium subangular blocky; friable; >0.5% biopores; common fine fibrous roots; abrupt wavy boundary.
25-34 cm	7.5 YR 4/6, strong brown; unmottled; medium clay loam; 25% total limestones; moist; moderately developed coarse subangular blocky; firm; >0.5% biopores; few fine fibrous roots.
34 cm +	Weathering limestone.

PIT 3

Profile Pit at:	B10 (see map)
Land Use:	Recently cultivated
Slope and Aspect:	1° NW
Recent Weather:	Dry and sunny

Horizon depth

0-27 cm	10 YR 3/2, very dark greyish brown; unmottled, medium silty clay loam; 8% limestones (5% >2 cm); moist; strongly developed medium subangular blocky; friable; >0.5% biopores; common fine fibrous roots; abrupt wavy boundary.
27-55 cm	7.5 YR 4/4, brown; unmottled; medium silty clay loam; 15% limestones; moist; moderately developed medium and coarse subangular blocky; firm; <0.5% biopores; few fine fibrous roots; gradual wavy boundary.
55 cm +	Weathering limestone.