CRAWCROOK QUARRY
TYNE AND WEAR

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

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Resource Planning Team
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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

CRAWCROOK QUARRY

INTRODUCTION

1. This report presents the findings of a detailed Statement of Physical Characteristics and Agricultural Land Classification (ALC) survey of 42 ha of land lying north-north-west of the village of Crawcrook, between the village and the River Tyne. Field survey work was carried out during February 1998.

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 updating of the working scheme for the quarry. This report and map supersede any previous ALC information for this site.

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 ley and permanent grass. Other land occurs in the centre of the site and consists principally of the existing Crawcrook Quarry and adjoining scrub and woodland.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. 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	6.3	18.5	14.9
3a	10.0	29.3	23.6
3b	11.3	33.1	26.8
4	0.4	1.2	0.9
5	6.1	17.9	14.4
Agricultural land not surveyed		N/A	
Other land	8.2	N/A	19.4
Total surveyed area	34.1	100	-
Total site area	42.3	-	100

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

8. Grade 2, very good quality agricultural land, occurs in two separate areas. The soils are well or moderately well drained and consist of light to medium-textured topsoils and upper subsoils overlying very light to medium-textured lower subsoils. The climate of the area and, in places, soil droughtiness are the factors which limit this land to Grade 2.

9. Subgrade 3a, good quality land, occurs in the north-west and centre. The soils are well drained and typically consist of light to medium-textured topsoils and upper subsoils overlying loamy sand or sand. Soil droughtiness is more of a problem than on the adjoining Grade 2 land and further restricts the ALC grade to 3a.

10. Subgrade 3b, moderate quality land, occurs in the north, centre and south. Some areas are limited to Subgrade 3b by slopes of 8° to 11°, some by soil droughtiness (where sandy loam and loamy sand topsoils overlie sand subsoils), and some by soil wetness (where medium-textured topsoils overlie gleyed and slowly permeable heavy-textured subsoils).

11. Grade 4, poor quality agricultural land, occurs in two areas where slopes of 13° are the grade-limiting factor.

12. Grade 5, very poor quality land, occurs in three areas. One (in the north) is subject to long-term waterlogging, one (in the far south) is limited to Grade 5 by slopes of around 25°, and one consists of very variable restored soils overlying a reinstated landfill, also in the south.

13. In terms of soil resources there are three main soil types, although the soils on the site are variable. The first, and most widespread, consists of sandy loam topsoils and sandy loam, loamy sand or sand subsoils. The second consists of medium-textured topsoils overlying medium to heavy-textured subsoils, with sandy loam or loamy sand at depth in places. The third soil type is the restored soil overlying the reinstated landfill in the south. The soils here are variable in terms of both texture and depth and are severely compacted below 40cm depth.

FACTORS INFLUENCING ALC GRADE

Climate

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

15. 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, north of Crawcrook Lane	Values, south of Crawcrook Lane
Grid reference	N/A	NZ 128 644	NZ 128 638
Altitude	m, AOD	35	55
Accumulated Temperature	day°C (Jan-June)	1325	1302
Average Annual Rainfall	mm	682	686
Field Capacity Days	days	173	174
Moisture Deficit, Wheat	mm	94	92
Moisture Deficit, Potatoes	mm	81	78
Overall climatic grade	N/A	Grade 1	Grade 2

16. 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.

17. 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.

18. The combination of rainfall and temperature at this site means that land over 45 m AOD is limited to Grade 2 by the climate of the area. Land at lesser altitude has no climatic limitation on ALC grade.

Site

19. Although neither flood risk nor microrelief are grade-limiting factors on this site, slopes vary between level and very steeply sloping (0-26°). Parts of the far south of the site are limited to Grade 5 by slopes of over 20° while many parts of the centre are limited to either Subgrade 3b or Grade 4 by slopes of between 7° and 13°. Aspect is variable.

Geology and soils

20. The site is underlain by Carboniferous Lower and Middle Coal Measures (BGS, Sheet 20) over which lie river terrace deposits (in the north) and glacial sand and gravel (elsewhere). Isolated pockets of till also occur in the area north of Crawcrook Lane and east of the quarry access track.

21. The soils have been mapped as belonging to the Newport 1 association and, in most cases, consist of light to medium-textured topsoils overlying light to very light-textured subsoils. Typically these soils are well drained. In parts of the north of the site medium-textured topsoils overlie medium to heavy-textured subsoils. The drainage status of these soils varies from moderately well to poorly drained.

AGRICULTURAL LAND CLASSIFICATION

22. 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

23. Land in this grade is found in two areas, one in the east and one in the north-east. The soils are well or moderately well drained, falling in Wetness Classes I and II. Typically very slightly to slightly stony sandy loam or sandy clay loam topsoils overlie similar subsoils, although horizons of loamy sand or sand occur at depth in places. The ALC grade of this land is limited by the climate of the area, and by a slight soil droughtiness restriction where loamy sand or sand subsoils occur at depth.

Subgrade 3a

24. Subgrade 3a land occurs in the north-west and in the centre of the site. Most profiles are well drained (Wetness Class I) with medium sandy loam or sandy clay loam topsoils and thin upper subsoils overlying loamy sand or sand. Topsoils and upper subsoils are very slightly to slightly stony (containing 4-10% hard stones in most cases) while lower subsoils are slightly to very stony (containing 4%-40% hard stones). The ALC grade of this land is limited by soil droughtiness.

Subgrade 3b

25. Subgrade 3b occurs over much of the north and centre and also in a smaller area in the south of the site. Three main soil types occur in these areas. The first consists of well or moderately well drained (Wetness Class I and II) profiles where medium clay loam or medium sandy loam topsoils and upper subsoils overlie either sandy loam/loamy sand or clay/heavy silty clay loam. Although the soils meet the criteria for Grade 1 or Grade 2, slopes of 8-11° limit the safe and efficient use of some types of agricultural machinery and it is this slope limitation which restricts the land to Subgrade 3b. The second main soil type is also well drained, and consists of sandy loam or loamy sand topsoils overlying sand subsoils. The ALC grade of this land is limited by soil droughtiness. The third main soil type consists of poorly drained (Wetness Class IV) profiles where medium clay loam topsoils overlie gleyed and slowly permeable heavy clay loam subsoils. In this case soil wetness is the grade-limiting factor.

Grade 4

26. Two small areas of Grade 4 land are found in the north of the site. The soils are well drained (Wetness Class I) and typically light-textured. However, slopes of 13° provide a significant limitation to the safe and efficient use of agricultural machinery and it is this factor which restricts these areas to Grade 4.

Grade 5

27. Grade 5 occurs in three areas. The first is a low-lying area north of Crawcrook Lane which appears to be almost permanently waterlogged. Soil wetness is the grade-limiting factor for this area. The second is an area of restored soils overlying a reinstated landfill. These soils are very variable both in terms of texture and depth, and the restoration is of low

quality. The combination of these factors means that the land has very severe limitations on cropping and yield and it is therefore limited to Grade 5. The third area of Grade 5 land occurs in the south where slopes of around 25° are the grade-limiting factor.

Other land

28. Other, non-agricultural, land consists of the existing Crawcrook Quarry, adjoining areas of scrub, and access roads.

STATEMENT OF PHYSICAL CHARACTERISTICS

29. Three main soil types were identified on the site, although the pattern of soils is somewhat complex. Descriptions of each are given below. Topsoil and subsoil resources are shown on the accompanying maps along with soil thickness and volume information. Representative pit descriptions for the two undisturbed soil types are given in Appendix II. The third soil pit described is a variant of Soil Type 1 and is therefore not included in the appendix. Although the restored soil profiles were examined by means of a soil pit, no one soil type is representative of this area due to the variation in texture and structure. For this reason a full description was not made.

a. Soil Type 1 (T1/U1/L1), light to very light-textured soil.

   This soil type occurs across most of the site. It is generally well drained and is characterised by its light-textured topsoil and its light to very light-textured subsoil.

b. Soil Type 2 (T2/U2/L1), medium to heavy-textured soil overlying loamy sand or sand at variable depth.

   This soil type occurs in the north. It is moderately well to poorly drained and is characterised by its medium-textured topsoil, its medium to heavy-textured upper subsoil and, in places, its light to very light-textured lower subsoil.

c. Soil Type 3 (T3/U3), restored soil.

   This soil occurs in the south of the site overlying a restored landfill site. The soils are very variable both in terms of depth and texture, and are typically severely compacted below 40cm depth.

Soil Resources

Topsoils

30. Unit T1 occurs in the south, centre and north-east. It consists of medium sandy loam or, in places, loamy medium sand, and has a moderately developed fine, medium or coarse subangular blocky structure. Unit T1 is very slightly to slightly stony, containing 4-10% hard stones in most cases, and has a median thickness of 25cm.

31. Unit T2 occurs in the centre and north-west of the site. It is medium-textured (medium clay loam or sandy clay loam) and very slightly to slightly stony, with between 2% and 10% hard stones. Unit T2 has a moderately developed medium and coarse subangular blocky structure and a median thickness of 30cm.

32. Unit T3 occurs in the south on the site of the reinstated landfill. Texture varies from loamy sand to sandy clay loam and this topsoil is slightly stony, containing 8-12% hard stones. Structure is variable, and the mean thickness of this unit is 25cm.

Upper Subsoils

33. Unit U1 occurs over most of the site. It can be subdivided into U1A (mean thickness 39cm) and U1B (mean thickness 15cm). Both U1A and U1B typically consist of very slightly to slightly stony (4-10% hard stones) medium sandy loams with a moderately developed coarse angular blocky and coarse subangular blocky structure.

34. Unit U2 consists of medium to heavy-textured upper subsoils (typically medium clay loam, sandy clay loam or heavy clay loam) and occurs in the north-east of the site. This unit typically has a moderately developed coarse angular blocky or medium prismatic structure and a mean thickness of 48cm.

35. Unit U3 underlies topsoil T3 on the reinstated landfill. Again texture is variable (loamy medium sand to heavy clay loam) and the soils are slightly stony, containing between 8% and 15% hard stones. Structure is variable and the mean thickness of Unit U3 is 25cm.

Lower Subsoils

36. One very light-textured lower subsoil is found on the site which consists of loamy sand or sand. It can be subdivided into Unit L1A (mean thickness 55cm, very slightly to slightly stony) and Unit L1B (mean thickness 70cm, moderately to very stony). Unit L1B occurs in the north-west of the site and Unit L1A elsewhere. Structure varies between single grain and weakly developed medium subangular blocky and coarse angular blocky.

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SOURCES OF REFERENCE

British Geological Survey (1992) *Sheet No. 20, Newcastle-upon-Tyne. 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 to very light-textured soil (T1/U1A/L1A)

Location: Grid Reference: NZ 1313 6401

Land Use: Ley grass

Slope: 7°E

Recent Weather: Mild and overcast

Depth (cm)	**Horizon Description**
0-38	Dark brown (10YR 3/3) medium sandy loam; no mottles; very slightly stony, containing around 3% hard stones (2% >2cm); moist; moderately developed fine subangular and medium subangular blocky structure; firm; very porous; many fine and very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear, smooth boundary.
38-86	Brown/dark brown (10YR 4/3) medium sandy loam; no mottles; very slightly stony, containing around 3% hard stones; moderately developed coarse angular blocky and coarse subangular blocky structure; firm; very porous; common very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; abrupt smooth boundary.
86-100	Brown/dark brown (10YR 4/3) medium sand; no mottles; very stony, containing approximately 40% very small to medium hard stones; wet; single grain structure; extremely porous; non-sticky; non plastic; non calcareous.
100-120	Light brownish grey (2.5YR 6/2) silty clay; many brownish yellow (10YR 6/8 mottles); very slightly stony, containing around 5% very small to medium hard stones; moist; moderately developed medium and coarse prismatic structure; very firm; slightly porous (<0.5% pores >0.5mm); moderately sticky; very plastic; non-calcareous.

Soil Type 2:	Medium to heavy-textured soil (T2/U2)
Location:	Grid Reference: NZ 1290 6430
Land Use:	Permanent grass
Slope:	8°NW
Recent Weather:	Mild and overcast

Depth (cm)	**Horizon Description**
0-23	Dark brown (10YR 3/3) medium clay loam; no mottles; slightly stony, containing approximately 8% hard stones (5% >2cm); slightly moist; moderately developed medium and coarse subangular blocky structure; firm; moderately porous; abundant very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear, wavy boundary.
23-120	Grey (10YR 5/1) heavy clay loam; many strong brown (7.5YR 5/8) mottles; slightly stony, containing around 8% hard stones; slightly moist; moderately developed medium prismatic and coarse angular blocky structure; very firm; slightly porous (<0.5% pores >0.5mm); common very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous.