STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION HOLME HALL QUARRY EXTENSION STAINTON SOUTH YORKSHIRE JANUARY 1995

ADAS
Leeds Statutory Group

Job No:- 11/95
MAFF Ref:- EL 10613
Commission No:- 1545

2FCS ~~10616~~ File 10250.

SUMMARY

A detailed Statement of Physical Characteristics and Agricultural Land Classification survey of ha of land at Stainton ("Holme Hall Quarry Extension") was carried out in September 1994. At the time of survey 150 ha of the site was in agricultural use of which 9.1 ha has been mapped as Grade 2 land. These soils are well drained and both topsoils and subsoils are generally medium-textured although heavy-textured lower subsoils occur in places. Weathering limestone bedrock often occurs at around 90 cm depth and slight soil droughtiness limits this land to Grade 2. Subgrade 3a land covers 29.2 ha. The soils are either well drained with medium-textured topsoils and subsoils overlying weathering limestone bedrock at around 55cm depth (in which case soil droughtiness limits the land to Subgrade 3a) or poorly drained with medium-textured topsoils overlying permeable medium or heavy-textured upper subsoils and slowly permeable heavy-textured lower subsoils (in which case soil wetness is the factor limiting the ALC grade).

Subgrade 3b land covers 111.7 ha. Again, two soil types fall within this subgrade. The first consists of medium-textured soils overlying weathering limestone bedrock at between 20cm and 45cm depth. Severe soil droughtiness and, in places, soil depth, limit this land to Subgrade 3b. The second soil type consists of poorly drained profiles where medium clay loam topsoils overlie slowly permeable heavy clay loam or clay subsoils at around 30cm depth. In this case soil wetness is the restricting factor.

The remainder of the area surveyed consists of Urban land (5.5 ha, part of an existing quarry in the south), Non Agricultural land (1.0 ha of baffle banks, also in the south), Woodland (0.3 ha in the north) and Agricultural Buildings (0.9 ha at Cockhill House, in the north).

CONTENTS

MAPS

STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED QUARRY EXTENSION AT HOLME HALL, STAINTON, SOUTH YORKSHIRE

1. INTRODUCTION AND SITE CHARACTERISTICS

1.1 Location and Survey Methods

The site lies approximately 12km east-north-east of Rotherham town centre, on the south side of the M18 motorway. Survey work was carried out in September 1994 when soils were examined by hand auger borings at 100m intervals predetermined by the National Grid. Four soil pits were dug to allow full profile descriptions to be made. A validation report was produced at that time commenting on the soils and Agricultural Land Classification report prepared by Reading Agricultural Consultants for the applicants, Tarmac Roadstone (MAFF Commission No 1326). The land quality information in this report is based on guidelines set out in "Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land" (MAFF, 1988).

1.2 Land Use and Relief

At the time of survey 95% of the site was in agricultural use, mostly as arable land, but with smaller areas of permanent grass and set-aside. The remaining 5% consists of Non Agricultural land, Woodland, Urban land and Agricultural Buildings.

Site altitude varies between 97m AOD in the south-west and 76m AOD in the north-east. The land is generally level to moderately sloping (1-4°) with an easterly or north-easterly aspect.

1.3 Climate

Grid Reference	: SK 546 959
Altitude (m)	: 85
Accumulated Temperature above 0°C (January - June)	: 1333 day °C
Average Annual Rainfall (mm)	: 645
Climatic Grade	: 1
Field Capacity Days	: 133
Moisture Deficit (mm) Wheat	: 101
Moisture Deficit (mm) Potatoes	: 90

1.4 Geology, Soils and Drainage

The west of the site is underlain by Lower Magnesian Limestone, which outcrops to within one metre or less of the soil surface over most of this area. The east is underlain by deposits of Middle Permian Marl. With the exception of locally derived Head deposits and two small areas of boulder clay in the south and east, there is no drift cover on this site, and generally the soils have formed over weathering limestone (in the west) or marl (in the east).

The soils formed over the limestone are well drained (falling in Wetness Class I) with medium clay loam or medium silty clay loam topsoils and subsoils overlying weathering limestone bedrock at between 20cm and 100cm depth in most cases.

The soils formed over the marl are typically imperfectly or poorly drained (falling in Wetness Classes III and IV) and consist of medium clay loam topsoils (and, in places, thin upper subsoils) overlying reddish slowly permeable heavy clay loam or clay. The soils formed in boulder clay are also imperfectly to poorly drained (Wetness Classes III and IV) with a medium clay loam topsoil and, in places, a thin medium or heavy clay loam upper subsoil overlying gleyed and slowly permeable heavy clay loam or clay.

1.5 Soil Properties

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

(a) Soil Type 1:- Medium textured soils (Unit T1/S1/Limestone).
(Full Profile Description, Table 1)

This soil, formed over weathering limestone, occurs in the west of the site. It is characterised by its medium-texture (medium clay loam or medium silty clay loam with a strongly developed subangular blocky structure) and the presence of weathering limestone, usually within 80cm depth of the soil surface.

(b) Soil Type 2:- Medium to heavy textured marly soils (Unit T2/S2)
(Full Profile Description, Table 2)

This soil, formed over Permian Marl, occurs in the east of the site. It is characterised by a reddish, slowly permeable heavy clay loam or clay subsoil with a weakly developed coarse prismatic structure.

(c) Soil Type 3:- Medium to heavy textured boulder clay soils (Unit T2/S3)
(Full Profile Description, Table 3)

This soil, formed over boulder clay, occurs in the south and east of the site. It is characterised by a gleyed and slowly permeable heavy clay loam or clay subsoil with a moderately developed coarse angular blocky and medium prismatic structure.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs in the west of the site and is derived from weathering limestone. It is medium-textured (medium clay loam or medium silty clay loam) and very slightly to slightly stony, with 2-8% small, medium and large subangular limestones. Unit T1 has a strongly developed fine and medium subangular blocky structure and a median depth of 25cm.

Unit T2 occurs in the east of the site and is derived from weathered marl and boulder clay. It is generally medium textured (medium clay loam) and very slightly stony, with around 3% small and medium rounded hard stones and subangular limestones. This unit has a moderately developed medium and coarse subangular blocky structure and a median depth of 30cm.

(ii) Subsoils

Unit S1 occurs in the centre, and, in pockets, in the west of the site. It is medium-textured, usually consisting of medium clay loam or medium silty clay loam, and very slightly to slightly stony, containing between 2% and 6% small, medium and large subangular limestones. Unit S1 has a strongly developed medium and coarse subangular blocky structure and a mean unit depth of 31cm.

Unit S2 occurs in the east of the site and is formed over Permian Marl. It is generally heavy-textured (heavy clay loam or clay) although medium-textured horizons of medium clay loam or sandy clay loam occur in places. It is typically very slightly stony, containing 2-4% small and medium subrounded hard stones and subangular limestones in most cases. This subsoil has a weakly developed coarse prismatic structure and a mean depth of 92cm.

Unit S3 occurs in two separate areas in the south and east of the site on deposits of boulder clay. It is generally heavy-textured, consisting of heavy clay loam or clay, and very slightly stony, containing 2-4% small and medium subrounded hard stones. Unit S3 has a moderately developed coarse angular blocky structure and a mean depth of 92cm.

2. SOIL PROFILE DESCRIPTIONS

Table 1 Medium-textured limestone soil, T1/S1/Limestone

Profile Pit 1 (Near auger boring 64)

Slope:- 1°E
Land Use:- Permanent Grass
Weather:- Dry

Depth cm	Horizon Description
0-20	Dark brown (10YR 3/3) medium silty clay loam; no mottles; very slightly stony, containing approximately 1% rounded sandstone pebbles; dry; strongly developed medium subangular blocky structure; slightly hard; moderately porous; many fine and very fine fibrous roots; slightly sticky; moderately plastic; non-calcareous; gradual smooth boundary
20-57	Strong brown (7.5YR 4/6) medium silty clay loam; no mottles; very slightly stony, containing approximately 2% rounded sandstone pebbles; dry; strongly developed medium and coarse subangular blocky structure; slightly hard; slightly porous; common very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; sharp wavy boundary
57+	Hard limestone bedrock

Table 2 Medium to heavy textured marly soil, T2/S2

Profile Pit 2 (Near auger boring 26)

Slope:- 0°
Land Use:- Arable
Weather:- Dry

Depth cm	Horizon Description
0-26	Very dark greyish brown (10YR 3/2) medium clay loam; no mottles; very slightly stony, containing approximately 2% rounded hard stones and subangular limestones; moist; moderately developed medium subangular blocky structure; firm; moderately porous; many fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; abrupt smooth boundary
26-39	Brown (10YR 5/3) medium clay loam; common yellow (10YR 7/6) mottles; very slightly stony, containing approximately 2% rounded hard stones and subangular limestones; dry; weakly developed coarse angular blocky structure; extremely hard; slightly porous (<0.5% pores > 0.5mm); few fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; abrupt smooth boundary.
39-120	Reddish brown (5YR 4/3) heavy clay loam; common reddish yellow (5YR 6/8) mottles; very slightly stony, containing approximately 2% angular limestones; dry; weakly developed coarse prismatic structure; extremely hard; slightly porous (<0.5% pores >0.5mm); few fine fibrous roots; moderately sticky; very plastic; non-calcareous

Table 3 Medium to heavy textured boulder clay soil, T2/S3

Profile Pit 3 (Near auger boring 142)

Slope:- 0°
Land Use:- Arable (recently harrowed)
Weather:- Sunny, warm

Depth cm	Horizon Description
0-26	Light olive brown (2.5Y 5/3) medium clay loam; no mottles; very slightly stony, containing approximately 2-3% small and medium rounded and subrounded hard stones; slightly moist; moderately developed coarse subangular blocky structure; firm; moderately porous; many very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear, smooth boundary
26-120	Brown (10YR 5/3) heavy clay loam; common distinct brownish yellow (10YR 6/8) mottles; very slightly stony, containing approximately 2-3% small and medium subangular limestones; slightly moist; moderately developed coarse angular blocky and medium prismatic structure; firm; slightly porous (<0.5% pores>0.5 mm); few very fine fibrous roots; moderately sticky; very plastic; non-calcareous

3. AGRICULTURAL LAND CLASSIFICATION

The ALC grades occurring on this site are as follows:

Grade/Subgrade	Hectares	Percentage of Total Area
1		
2	9.1	5.8
3a	29.2	18.5
3b	111.7	70.8
4		
5		
(Sub total)	(150.0)	(95.1)
Urban	5.5	3.5
Non Agricultural	1.0	0.6
Woodland	0.3	0.2
Agricultural Buildings	0.9	0.6
Open Water		
Land not surveyed		
(Sub total)	(7.7)	(4.9)
TOTAL	157.7	100

3.1 Grade 2

Grade 2 land occurs in the north of the site. The profiles are well drained, falling in Wetness Class I, and typically consist of medium clay loam or medium silty clay loam topsoils overlying medium clay loam, medium silty clay loam or sandy clay loam subsoils. Horizons of clay or heavy clay loam occur at depth in places and weathering limestone bedrock is often found at around 90cm depth. Both topsoils and subsoils are very slightly stony, containing 2-4% small and medium limestones and hard stones, and it is slight soil droughtiness which limits this land to Grade 2.

3.2 Subgrade 3a

Land in this subgrade is found mainly in the centre of the site but also in one area in the north and two in the south. Two distinct soil types fall within this subgrade. The first consists of well drained profiles (Wetness Class I) where medium clay loam or medium silty clay loam topsoils and subsoils overlie weathering limestone bedrock at around 55cm depth. A more severe soil droughtiness restriction than on the adjoining Grade 2 land restricts these areas to Subgrade 3a.

The second soil type consists of imperfectly drained profiles (Wetness Class III) where medium clay loam topsoils overlie permeable medium clay loam or heavy clay loam upper subsoils and slowly permeable heavy clay loam or clay lower subsoils. The lower subsoils typically begin at around 50cm depth and soil wetness restricts this land to Subgrade 3a.

3.3 Subgrade 3b

The remainder of the agricultural land on this site falls in Subgrade 3b. Again, two distinct soil types occur. The first, in the west, consists of very slightly to slightly stony medium clay loam or medium silty clay loam topsoils and, in places, subsoils, overlying weathering limestone bedrock at between 20cm and 45cm depth. These soils are well drained, falling in Wetness Class I, but severe soil droughtiness and, in places, soil depth, limit the land to Subgrade 3b.

The second soil type consists of poorly drained soils (Wetness Class IV) in the east where medium clay loam topsoils overlie slowly permeable heavy clay loam or clay subsoils at between 25cm and 35cm depth. Soil wetness limits this land to Subgrade 3b.

3.4 Urban

This category covers the minor roads which cross the site and an area in the south-east (adjoining an existing quarry) where the soils have already been removed.

3.5 Non Agricultural

This category includes an area of baffle banks in the south.

3.6 Woodland

A small area of woodland occurs west of Cockhill House, in the north.

3.7 Agricultural Buildings

This category includes the farmhouse and outbuildings at Cockhill House.

RPT File: 2 FCS 10250
Leeds Statutory Centre

MAPS