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Ministry of
Agriculture
Fisheries
and Food

STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION

ARMTHORPE QUARRY
SOUTH YORKSHIRE
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ADAS

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SUMMARY

A detailed Statement of Physical Characteristics and Agricultural Land Classification (ALC) survey of 15.4 hectares of land east of Armthorpe("Armthorpe Quarry") was carried out in September 1995. At the time of the survey 11.7 hectares of the site was in agricultural use, of which 2.4 hectares falls in Grade 2. The soils on these areas are well to imperfectly drained, with slightly stony light-textured topsoils over slightly to moderately stony light to medium -textured subsoils. In some areas the subsoils are gleyed and slowly permeable below 30cm depth and the ALC grade is limited by slight soil wetness and/or droughtiness and topsoil stoniness.

Subgrade 3a land covers 3.6 hectares and two main soil types are found on this land. The first consists of imperfectly drained soils where sandy clay loam topsoils overlie gleyed and slowly permeable sandy clay loam subsoils at around 40cm depth. Soil wetness restricts the ALC grade of these areas. Elsewhere slightly stony light-textured topsoils overlie slightly stony light or very light-textured upper subsoils and slightly to moderately stony very light-textured lower subsoils. The profiles are well drained but moderate soil droughtiness limits the ALC grade of these areas.

Subgrade 3b land covers 5.7 hectares. The soils are well drained, with slightly to moderately stony, light to very light-textured topsoils overlying slightly to moderately stony very light textured subsoils. A more severe soil droughtiness limitation restricts this land to Subgrade 3b.

The remainder of the area surveyed consists of Urban land (3.5 hectares) and Non Agricultural land (0.2 hectares).

In terms of soil resources, two main soil types occur on the site. The first consists of slightly to moderately stony loamy medium sand topsoils and subsoils, while the second generally consists of slightly stony medium sandy loam or sandy clay loam topsoils overlying slightly to moderately stony medium sandy loam or sandy clay loam subsoils. Both topsoil types have a mean depth of 30cm and both subsoil types a mean depth of 90cm.

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1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS

1.1 Location and Survey Methods

This 15.4 hectare site lies 8km east-north-east of Doncaster town centre, to the south-east of the M18/A630 road junction. Survey work was carried out in September 1995, when the soils were examined by hand auger borings at 100m intervals predetermined by the National Grid, and two soil pits were dug to allow full profile descriptions to be made. The land quality was assessed using the methods described 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 the survey the westernmost field was in linseed stubble while the field in the centre of the site appeared to be in set-aside. Urban land and Non Agricultural land, consisting of the existing quarry and adjacent areas in the east of the site, covered approximately 24% of the site area.

Site altitude varies from 7m AOD in the north to 5m AOD in the south, and the land is level to gently sloping (0-2°) with a south-easterly aspect.

1.3 Climate

Grid Reference	:SE651 049
Altitude (m)	:7
Accumulated Temperature above 0°C (January - June)	:1415 day °C
Average Annual Rainfall (mm)	:570
Climatic Grade	:1
Field Capacity Days	:117
Moisture Deficit (mm) Wheat	:114
Moisture Deficit (mm) Potatoes	:107

1.4 Geology, Soils and Drainage

The area is underlain by Bunter Sandstone over which lie deposits of non-calcareous fluvioglacial drift. On the higher land the surface drift consists of slightly to moderately stony medium sandy loam or loamy medium sand topsoils overlying slightly to moderately stony loamy medium sand subsoils. These profiles are well drained, falling in Wetness Class I. On the lower lying land the soils vary between well and imperfectly drained (Wetness Classes I to III), with medium sandy loam or sandy clay loam topsoils overlying similar textured subsoils. The topsoils on these lower areas are slightly stony while the subsoils are slightly to moderately stony.

The soils on the site correspond to the Newport 1 Association as mapped by the Soil Survey and Land Research Centre.

1.5 Soil Properties

Two 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:- Very light textured soils (Unit T1/S1)
(Full Profile Description, Table 1)

This soil, formed on sandy drift, occurs on the higher land, mainly in the north of the site. It is characterised by slightly to moderately stony loamy medium sand topsoils and subsoils.

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

This soil, formed on loamy drift, occurs on the lower-lying parts of the site, mainly in the south. It is characterised by slightly stony sandy loam or sandy clay loam topsoils over similar textured but slightly to moderately stony subsoils.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs on the higher land, mainly in the north of the site. It is very light-textured, consisting of loamy medium sand, and slightly to moderately stony, with 6% to 20% small, medium and large, rounded and subrounded hard stones. This topsoil has a weakly developed medium subangular blocky structure and a median depth of 30 cm.

Unit T2 occurs on the lower-lying land, mainly in the south. It is generally light-textured (medium sandy loam) and is slightly stony, with between 6% and 12% small, medium and large subrounded and rounded hard stones. It has a moderately developed medium subangular blocky structure and median unit depth of 30 cm.

(ii) Subsoils

Unit S1 underlies topsoil T1 on the higher ground on the site. This subsoil is very light-textured, consisting of loamy medium sand, and slightly to moderately stony, with10-30% very small to very large rounded and subrounded hard stones in most cases. Occasionally horizons of sandy clay loam or medium sandy loam occur below around 80cm depth and where these occur they should be stripped separately and stored with subsoil unit S2. This subsoil type has a weakly developed fine granular structure and a mean depth of 90cm.

Unit S2 occurs in lower lying areas, below topsoil T2. It is light to medium-textured, consisting of medium sandy loam or sandy clay loam in most cases, and has a weakly developed coarse subangular blocky structure. Unit S2 is typically slightly to moderately stony (containing 8% to 18% very small to very large rounded and subrounded hard stones), and has a mean depth of 90cm.

2. SOIL PROFILE DESCRIPTIONS

Table 1 Very light textured soil, T1/S1

Profile Pit 1 (Near auger boring 8)

Slope:- 1° SE

Land Use: - Set aside

Weather:- Bright and warm

Depth cm	Horizon	Description
0-30		Dark brown (10YR3/3) loamy medium sand; no mottles; moderately stony, with around 20% very small to large rounded and sub-rounded hard stones (13% >2cm); slightly moist; weakly developed medium subangular blocky structure; friable; extremely porous; abundant fine and very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; abrupt smooth boundary.
30-120		Strong brown (75.YR 5/6) loamy medium sand; no mottles; moderately stony, with around 30% very small to large rounded and subrounded hard stones; slightly moist; weakly developed fine granular structure; very friable; extremely porous; abundant fine and very fine fibrous roots to 60cm depth, common below 60cm; slightly sticky; slightly plastic; non-calcareous.

Table 2 Light to medium textured soil, T2/S2

Profile Pit 2 (Near auger boring 9)

Slope:- 0°

Land Use:- Set aside

Weather:- Bright and warm

Depth cm	Horizon	Description
0-33		Dark brown (10 YR 3/3) medium sandy loam; no mottles; slightly stony, containing around 7% small and medium rounded and subrounded hard stones (6% >2 cm); moist; moderately developed medium subangular blocky structure; firm; very porous; abundant very fine fibrous and common fine fibrous roots; slightly sticky; moderately plastic; non-calcareous; abrupt smooth boundary.
33-120		Very pale brown (10 YR 7/3) sandy clay loam; common distinct brown (7.5 YR 5/3) and strong brown (7.5 YR 5/6) mottles; slightly stony, containing around 8% small and medium rounded and subrounded hard stones, but extremely stony (75% stones) on one side of pit; slightly moist; weakly developed coarse subangular blocky to massive structure; extremely firm; moderately porous, but <0.5% pores >0.5mm; common fine and very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous.

2. AGRICULTURAL LAND CLASSIFICATION

The ALC grades occurring on this site are as follows:

Grade/Subgrade	Hectares	Percentage of Total Area
1		
2	2.4	15.6
3a	3.6	23.4
3b	5.7	37.0
4		
5		
(Sub total)	(11.7)	(76.0)
Urban	3.5	22.7
Non Agricultural	0.2	1.3
Woodland		
Agricultural Buildings		
Open Water		
Land not surveyed		
(Sub total)	(3.7)	(24.0)
TOTAL	**15.4**	**100**

3.1 Grade 2

Grade 2 land occurs in a small area in the west of the site. The soils vary from well to imperfectly drained (Wetness Classes I to III) and consist of medium sandy loam topsoils overlying medium sandy loam, sandy clay loam or medium clay loam subsoils. The medium-textured subsoils are gleyed and slowly permeable in places whilst topsoils are slightly stony (typically containing 6-8% hard stones greater than 2cm in size) and the subsoils are slightly to moderately stony (containing 8-18% total hard stones). The ALC grade of this land is limited by soil droughtiness, topsoil stoniness and, in some places, soil wetness.

3.2 Subgrade 3a

Subgrade 3a land is found in the west and south of the site. Alongside Diggin Dike (in the south) the soils are imperfectly drained, falling in Wetness Class III, with sandy clay loam topsoils overlying gleyed and slowly permeable sandy clay loam subsoils at around 40cm depth. Soil wetness limits this land to Subgrade 3a. Elsewhere the soils are well drained (Wetness Class I), with slightly stony medium sandy loam topsoils overlying slightly stony medium sandy loam or loamy medium sand upper subsoils and slightly to moderately stony loamy medium sand lower subsoils. Horizons of sandy clay loam occur below around 80cm depth in places but the soils are moderately droughty, especially for shallow-rooting crops, and it is this soil droughtiness restriction which limits this land to Subgrade 3a.

3.3 Subgrade 3b

The higher land on this site falls in Subgrade 3b. The profiles are well drained, falling in Wetness Class I, and consist of medium sandy loam or loamy medium sand topsoils overlying loamy medium sand subsoils. The topsoils are slightly to moderately stony, containing 5 - 13% stones greater than 2cm in size, while the subsoils are slightly to moderately stony, with 10-25% total hard stones. Occasionally sandy clay loam horizons are found below 80cm depth but these soils are very droughty, particularly for shallow-rooting crops such as potatoes, and it is severe soil droughtiness which restricts the land to this subgrade.

3.4 Urban

Urban land, consisting of existing quarry workings and an adjoining area of hard standing, occurs in the east of the site.

3.5 Non Agricultural

A narrow band of Non Agricultural land consisting of scrub adjoining the existing quarry workings is found in the south-east.

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MAPS