PHYSICAL CHARACTERISTICS REPORT FOR LAND AT BILSTHORPE MOOR

1. INTRODUCTION

Following the request for detailed information on the physical characteristics of soil at Bilsthorpe Moor, members of the Resource Planning Group visited the site during January 1991. An Agricultural Land Classification Survey was undertaken and soils augered to 100 cms and soil pits dug to determine the physical characteristics.

Location, Altitude and Relief

The site lies to the east of the village of Bilsthorpe, and immediately north of Belle Eau Park. The site is bounded by open fields, except for a complex of agricultural and foodstuff buildings to the south, and Fox Holes wood to the north-east.

Altitude on the site varies between 83 metres on the north-western boundary, and 53 metres on its south-eastern boundary. Relief is undulating. Altitude and relief are non-limiting factors in the classification of this site.

Climate and Rainfall

The main parameters used in the assessment of the climatic limitations are average annual rainfall (AAR), and accumulated temperature (ATO). For this site these figures are 670 mm and 1356°C respectively, indicating that there are no climatic limitations on the site. The field capacity days figure for the site is 141 days. The mean last frost is in early May.

Geology and Soils

The formations in the area are Sedimentary rocks of the Triassic System. The majority of the site is underlain by Keuper Waterstones, comprised of interbedded mudstones, micaceous sandstones and siltstones. Adjoining the buildings in the south is a limited area of Pebble Beds, which consist of pebbly sandstone.

The soils associated with the Keuper Waterstones are typically sandy silt loams or medium clay loams, overlying medium clay loams, often alternating with bands of marl and siltstone at depth. Their essential characteristics are similar to a Hodnet Series soil.

This soils associated with the Pebble Beds are typically sandy loam or sandy silt loam overlying sandy loams, often with weathered sandstone at depth. These are similar to Newport Soil Series.

Land Use

At the time of survey the site was in arable cultivation, with winter cereals being grown over the majority of the site, apart from a field of oilseed rape in the south-west.

2. AGRICULTURAL LAND CLASSIFICATION

Grade 2 is mapped over 6.5 hectares and accounts for 17% of the site. It occurs in two blocks. In the area immediately adjoining the buildings in the south, soils are typically sandy loam or sandy silt loam to depth or overlying weathered sandstone with bands of clay. In the centre of the site there are smaller areas of similar soils often intermixed with heavier clay bands. Droughtiness is the main limitation to the agricultural use of this land.

Sub-grade 3a is mapped over 14.3 hectares and accounts for 38% of the site. It occurs in the central part of the site. Soils are typically sandy silt loam overlying sandy silt loam or medium clay loam with lower subsoils ranging from weathered sandstone to heavy clay loam. Within this area isolated profiles of grade 2 and sub-grade 3b occur, reflecting the natural variations found within these soils.

Sub-grade 3b is mapped over 15.5 hectares and accounts for 42% of the site. It occurs in the northern part of the site, broadly corresponding to the area of proposed clay extraction. Soils are typically medium clay loams, overlying heavy clay loams with clay at depth. These soils are imperfectly to poorly drained with evidence of mottling and gleying. Wetness is the main limitation to the agricultural use of this land.

Grade 4 is mapped over 1.0 hectares and accounts for 3% of the site. The soils are similar to those in the surrounding sub-grade 3b land, except for the presence of concrete, rubble and brick fragments which may hinder cultivations. This land occupies the site of demolished agricultural buildings.

Breakdown of ALC grades

Grade	Area (ha)	% of site
2	6.5	17
3a	14.3	38
3b	15.5	42
4	1.0	3
TOTAL	37.3	100

3. SOIL UNITS

A detailed survey of the site was carried out using a hand-held auger at a density of 1 boring per hectare. All borings were to 100 cms, unless prevented from achieving this depth by stones or weathering sandstone. In addition, three soil pits were dug to determine the physical characteristics of the soil. From this information three different soil units have been identified. These have been separated according to their textures, which reflect their different handling characteristics and separate storage needs.

Unit 1

This unit occurs in the northern part of the site and broadly corresponds to the area of proposed clay extraction. Soils are typically reddish brown (5YR 4/4) medium clay loams to 25 cms, overlying reddish brown (5YR 5/4) medium or heavy clay loams, with reddish brown (5YR 5/3) heavy clay loams or clay occurring below 50 cms. This lower boundary is sometimes indistinct, and may be interupted by bands of weathering siltstone, alternating with marl.

Structurally, the topsoils are moderately to strongly developed medium subangular blocky. The upper subsoils display a coarse angular structure becoming very coarse at depth. The lower subsoils are very coarse, but may contain fine angular peds representing the original siltstone structure.

Unit 2

This unit occurs in the central part of the site. Soils are typically dark greyish brown (10YR 4/2) sandy silt loam to 35 cms, overlying light yellowish brown (10YR 6/4) sandy loams, sandy silt loams or medium clay loams, extending to 50 cms. These overlie a wide variety of lower subsoils, ranging from sandy loams, sandy silt loams and weathered siltstones, through to medium and heavy clay loams.

Structurally, the topsoils are weakly to moderately developed fine to medium subangular blocky, with occassional angular peds. Below 35 cms the soils are more variable although the upper subsoils are more commonly sandy silt loams with a moderately developed fine to medium angular structure. At depth bands of unaltered sandstone are common. These soils were locally calcareous.

Unit 3

This unit occurs in the southern part of the site. These soils are typically dark brown (10YR 3/3) sandy loams which extend to up to 45 cms. These overlie yellowish brown (10YR

5/4) sandy loams or sandy silt loams, which may extend to 100 cms. Although the soil pit revealed a light olive brown heavy clay loam (2.5YR 5/3) below 70 cms, other profiles revealed weathered sandstone below 70 cms.

Structurally, these soils are weakly developed fine subangular blocky in the topsoil, overlying weakly to moderately developed fine subangular blocky, turning to single grain at depth. These soils are the only stony soils on the site, with an average topsoil stone content of 5%, comprised of rounded quartzite pebbles up to 10 cms, but averaging 1-2 cms in length.

Resource Planning Group
Wolverhampton RO
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