

FOR DIVISIONAL USE ONLY

AGRICULTURAL LAND CLASSIFICATION

Land South West of Bourne, Lincolnshire

1. INTRODUCTION

1.1 An Agricultural Land Classification (ALC) survey was carried out over 116.6 ha of land on the south west side of Bourne, Lincolnshire, in September 1989.

1.2 The published 1: 63 360 scale ALC map, sheet 123 (Provisional) (MAFF 1963) maps the majority of the site as grade 3, but identifies a small area of grade 2 land in the east of the site, adjacent to South Road. These maps are essentially of reconnaissance nature and are inappropriate for site-specific appraisals of land quality. They do not always show areas of individual ALC grades extending to less than approximately 80 ha, consequently the current survey was undertaken to provide a more detailed ALC of the area.

1.3 A total of 112 soil inspections were made over the site on a 100 m grid basis, giving an intensity of inspection of approximately 1 per ha. Soils were sampled to a depth of 120 cms using a hand-held Dutch soil auger and information obtained was supplemented by data from 5 soil inspection pits.

1.4 At the time of survey, land in the south east of the site, south of New Farm, and in the west, north and north-east of the pond, was under grass. The remainder of the site was in arable use, principally growing cereals and beans.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Bourne lies in an area of low rainfall by national standards and the site has an estimated annual average rainfall of 591 mm, (Met Office 1989). This is relatively evenly distributed throughout the year,

although slightly lower figures are recorded for the months of February to April (MAFF 1984). This slight spring minimum will aid spring cultivations on heavier soil types.

- 2.2 In low rainfall areas it is important for soils to retain adequate reserves of plant available water and so minimise the risk of drought. Clayey and fine loamy soil textures, such as those found south-west of Bourne, hold relatively large volumes of water, so that the risk of drought on most soil types at this site is low.
- 2.3 Bourne has an estimated growing season of 247 days extending from the end of March to the end of November (MAFF, 1984). Soils are at field capacity for a relatively short period of 114 days and soil moisture deficits are recorded as 117 mm for wheat and 112 mm for potatoes, (Met Office, 1989).
- 2.4 The site is neither particularly exposed nor frost-prone.
- 2.5 Climate itself is not limiting to agricultural quality. However, the interaction of climate with soil texture at this site results in wetness and workability limitations for most soil types. Small areas are also susceptible to drought.

#### Altitude and Relief

- 2.6 The site is generally level or gently sloping and lies at about 10 m AOD in the south-east, adjacent to South Road, and rises to a maximum of 25 m AOD in the north-west, towards West Road.
- 2.7 Gradient and altitude are not limiting to agricultural land quality.

### 3. GEOLOGY AND SOILS

- 3.1 The published 1:63 360 solid and drift edition geology map of the Bourne area (Sheet 143; Geol. Surv. of GB, 1972), shows the north and east of the site to be underlain by Jurassic Clay whilst the remainder is underlain by Kellaways Sands.

3.2 The 1:250,000 map "Soils of Eastern England" (Soil Surv. of England & Wales, 1984) shows the soils in the north east of the site to belong to the Aswarby Association\*, the remainder of the site is mapped as Curdridge Association.\*\*

3.3 The current survey showed the Aswarby Association to be absent from the site area. The Curdridge Association was not present in its coarse loamy phase but was represented by clayey and fine loamy over clayey soils which also occur in conjunction with this Association.

3.4 Three main soil types are identified at this site.

3.4.1 The first main soil type occurs in the south-east of the site adjacent South Road, in the north-east of the site to the south of the "Well Head Fields" and in a small area north of the pond. Soils of this type typically comprise non-calcareous heavy clay loam and medium clay topsoils (very occasionally medium clay loam), over medium clay upper sub-soils with heavy clay occurring at varying depths within the profile. Occasionally non-calcareous heavy clay loam or medium clay topsoils directly overlie heavy clay.

3.4.2 Secondly, along the south western boundary of the site and around the unsurveyed spur of the dismantled railway, lighter soils are identified. Here, soils typically comprise non-calcareous medium clay loam (occasionally heavy clay loam) topsoils over heavy clay loam (very occasionally medium clay loam) upper subsoils which occasionally extend to depth, but more commonly overlie medium clay and heavy clay lower subsoils below 40-50 cms depth. Some of the deeper clay loam profiles, especially to the west and south of the pond, contain varying quantities of sand and fine sand. Sandy clay loam horizons were often recorded at depths of between 40 cms and 60 cms, with clay and occasionally sandy clay at depth.

\* Aswarby Association: Shallow permeable calcareous fine loamy soils over limestone, some affected by groundwater. Some slowly permeable seasonally water-logged clayey soils.

\*\* Curdridge Association: Deep, stoneless, permeable coarse loamy soils with groundwater controlled by ditches. Some slowly permeable seasonally water-logged clayey soils.

3.4.3 A third, soil type with lighter horizons at depth, is found to the north-west of the pond; south-west of the Motte and Bailey castle; and both to the east and west of the unsurveyed spur of the dismantled railway. Profiles typically comprise medium or heavy clay loam topsoils over upper sub-soils of heavy clay loam to 40-50 cms depth. These commonly overlie medium clay (or occasionally heavy clay loam) which become progressively lighter textured at depths below 50-80 cms. Below 50-80 cms are horizons of sandy clay loam, sandy loam, loamy sand and very occasionally sand.

3.5 Three profiles to the east of the pond show signs of disturbance. Personal communication with the landowner indicates that this has resulted from the digging out of clay for bricks, and subsequent infilling with ash and other waste. Some disturbance also arises from the dismantling of the old railway. This disturbance is only thought to be limiting to agricultural land quality at one boring where ash directly underlies the topsoil, effectively contributing a drought limitation. This was considered too inextensive to delineate at the scale of mapping shown.

3.6 Soil profile pit investigations show the drainage status of soils at this site to vary from wetness class II to wetness class III. Wetness and consequently workability constitute the main limitation in terms of agricultural land quality. However, some of the lighter textured soils at this site have a minor risk of drought in this low rainfall area.

#### 4. AGRICULTURAL LAND CLASSIFICATION

4.1 The site has been graded using the Revised Guidelines and criteria for grading the quality of agricultural land, (MAFF, 1988). Under this system, land is graded according to the degree to which physical or chemical characteristics impose long-term limitations on agricultural use.

4.2 Definitions of the Agricultural Land Classification grades are set out in Appendix 1.

4.3 The table below shows the breakdown of ALC grades for the land to the south-west of Bourne.

Grade	ha	%
2	33.8	29.0
3a	42.4	36.4
3b	35.1	30.1
agricultural buildings	4.2	3.6
non-agricultural	1.1	0.9
Total	116.6	100

## 5. GRADE 2

Land of this quality is found in the extreme north-west of the site, south of West Road; in the north, south of the Motte and Bailey castle; and in the central and south-eastern part of the site around the unsurveyed spur of the dismantled railway.

5.1 Grade 2 land is associated with the better drained and lighter soils described in paragraphs 3.4.2 and 3.4.3. Soils described in paragraph 3.4.2 and graded 2 typically comprise non-calcareous medium clay loam topsoils over heavy clay loam upper subsoils, with medium clay and heavy clay at depths below 40 cms. Soil pit observations indicate that these soils have minor wetness limitations and are restricted to wetness class II. Sandier soil variants (described in paragraph 3.4.3) with non-calcareous medium clay loam topsoils over heavy clay loam with medium clay from 40-50 cms which becomes progressively lighter textured (sandy clay loam, sandy loam and loamy sand) are also assessed as wetness class II. These soils are thus limited by minor winter wetness and workability constraints which derive from the slightly impaired soil drainage combined with medium and fine loamy topsoil textures. This, together with the slight risk of summer drought, excludes the land from grade 1. In areas of lighter soil types (see paragraph 3.4.3) where soils overlie lighter textured sandy loam, sandy clay loam and loamy sand at depth, drainage is assessed as wetness class I, and soils are restricted to grade 2 by minor drought imperfections.

6. SUBGRADE 3a

Three areas have been graded 3a; along the south-west boundary of the site; in the north-east of the site, south of the playing field; and in the south-east, adjacent to South Road.

- 6.1 Land of this quality is associated with variants of soils described in paragraph 3.4.2 in areas where heavy clay loam topsoils predominate. Land of this quality is also associated with soils described in paragraph 3.4.1 in areas where only minor wetness limitations exist (wetness class II). Moderate wetness and workability constraints result from the interaction of reduced subsoil permeability and fine loamy topsoil textures, and this limits the land to subgrade 3a.

7. SUBGRADE 3b

- 7.1 Two areas have been graded 3b. Land of this quality is associated with soils described in paragraph 3.4.1 where non-calcareous heavy clay loam or medium clay topsoils immediately overlie clay which typically becomes increasingly heavy with depth. It is also associated with variants of soils described in paragraph 3.4.2 where non-calcareous heavy clay loams overlie gleyed heavy clay loams before medium and heavy clay textures are encountered at depth. These soils are again assessed as wetness class III and this, combined with the heavy, non-calcareous, topsoil textures restricts the land to subgrade 3b. This land is consequently limited by more serious wetness and workability constraints which require more careful management if soil structural damage is to be avoided. This mapping unit also includes a small area of disturbed ground east of the pond. Here small brick and concrete fragments, together with ashy deposits were identified throughout the soil profile. In general terms, wetness and workability constraints constitute the chief limitation to agricultural land quality in this area, and the land is restricted to subgrade 3b. At one location, where ashy deposits occur immediately beneath the topsoil, a severe

droughtiness limitation forms the major constraint to agricultural production. This area is not sufficiently extensive, however, to delineate separately at the scale shown, and is included in the area mapped as subgrade 3b.

8. NON-AGRICULTURAL

8.1 Two categories of non-agricultural land have been mapped. In the west of the site, the pond and wide grass track have been mapped as non-agricultural. Four areas of land comprising a mixture of residential and agricultural buildings have been mapped as agricultural buildings.

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## References

MAFF, 1963: Agricultural Land Classification (Provisional), Sheet 123,  
scale 1:63 360

METEOROLOGICAL OFFICE, 1989: Climatological Data for Agricultural  
Classification

MAFF, 1984: The Agricultural Climate of England and Wales, Reference Book  
435, HMSO, London

GEOLOGICAL SURVEY OF GREAT BRITAIN, 1972: Solid and Drift Edition Geology,  
Sheet 143, scale 1:63 360

SOIL SURVEY OF ENGLAND AND WALES, 1983: Soils of Eastern England, Sheet 4,  
scale 1:250 000

MAFF, 1988: Agricultural Land Classification of England and Wales - Revised  
guidelines and criteria for grading the quality of agricultural  
land. Alnwick