Cambs 29/92

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

EXTENSION TO TRINITY OPENCAST COAL SITE, NEAR LANGLEY MILL, DERBYSHIRE

1. BACKGROUND

1.1 The site an area of 14.5 hectares is the subject of an application to extend the Trinity opencast coal site near Langley Mill, Derbyshire. Sixty-three percent of the site (the four western fields) have been subject to excavation as part of the earlier Petel opencast coal workings. These fields have been restored and show signs of disturbance. The remaining land (37%) has not been worked and still shows signs of ridge and furrow practise.

1.2 The current survey was adopted to provide detailed information on the agricultural land quality and soil physical characteristics of land within the survey area. The ALC grading of the disturbed land reflects conditions at the time of survey rather than an assessment of the land's long term potential. Consequently this area is shown on the ALC map as a colour with a stipple to distinguish it from undisturbed land of the same quality.

1.3 The main factors influencing the ALC grade are the result of interactions between soil and climatic factors, namely wetness and workability. Subsoil compaction which has been caused during soil handling at the stripping and subsequent reinstatement stages also influences the land quality of the disturbed land.

2. SITE PHYSICAL FACTORS

Climate

2.1 Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the survey area the annual average rainfall is 742 mm (29.2"). Field capacity days are 176 and moisture deficits are 96 mm for wheat and 85 mm for potatoes. These climatic characteristics do not impose any climatic limitation on the Agricultural Land Classification (ALC) grade of the site.

Altitude and Relief

2.2 The land surveyed falls gently eastwards from an altitude of 99 m AOD (adjacent to Aldecar Lane) to 69 m AOD adjacent to the railway line. Neither gradient nor altitude constitute limitations to the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION (ALC)

3.1 The definitions of the ALC grades are included in Appendix 1. The disturbed land ALC grade to the west, indicates the condition of the land at the time of survey and is therefore shown with a stipple and ALC colour on the ALC map.

3.2 The majority of the site comprises grade 4 (disturbed land) with a smaller area, eastwards, of grade 3b. The table below shows the breakdown of ALC grades in hectares and % terms.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
3b	5.3	37
4 (disturbed)	9.2	63
TOTAL	14.5	100

Subgrade 3b

3.3 The subgrade 3b land is associated with the soils described in paragraph 4.2.2. Profile pit observations indicate that the subsoils are slowly permeable directly below the topsoil, as a result the wetness class has been assessed as IV. The fine loamy topsoils combine with profile wetness to significantly limit the agricultural flexibility of this land, consequently the land is limited to subgrade 3b (moderate quality agricultural land).

Grade 4 (Disturbed)

3.4 The worked land to the west has been graded 4 and the soils are fully described in paragraph 4.2.1. Topsoils were uniform in depth, with little evidence of subsoil contamination, however they tended to be

slightly shallower (typically 15 cm) than the topsoils of the undisturbed adjacent land (20 cm). Profile stone includes small coal fragments at depth but these were not present in the upper horizons at high densities which could hinder cultivations.

3.5 Upper subsoil conditions were extremely hard due to compaction created during soil movement. Structure tended to be moderately developed very coarse platy but smaller angular blocky peds were becoming evident which may indicate that the structure is beginning to gradually improve. Subsoiling of the area may speed up this process. As a result of the platy structure the upper subsoil was assessed as very slowly permeable. Below depths of 45/55 cm the soil is less compact and structures resemble those typical of poorly drained, undisturbed, clayey soils.

3.6 The very poor subsoil structural conditions as described above act to severely limit the period of time available for cultivating the land. In wetter months the topsoil may remain saturated for long periods, following rainfall, because the water cannot run easily through the subsoil layers. Consequently the cultivation of this land will be restricted to the drier summer months. The topsoils are shallower than the adjacent undisturbed land but it was not considered to be a significant limiting factor. Consequently the severe wetness and workability imperfections restrict the land to grade 4 (poor quality agricultural land).

4. SOIL PHYSICAL FACTORS

Geology and Soils

4.1 No geology map is available for the site. However, the adjacent small scale (1:250,000) geology sheet 52°N-02E (1985) indicates that the solid geology is likely to be Carboniferous Shales and Sandstones (Coal measures).

4.2 The reconnaissance scale 1:250,000 soils map (Sheet 3, Soil Survey of England and Wales, 1983) shows the area to comprise mainly the Dale Association (*1) with a smaller area of disturbed opencast coal land identified to the west. During the current survey a more detailed soil inspection confirmed the presence of two main soil types.

Soil Type 1 (refer to Appendix 2 and Soil Map)

4.2.1 The majority of the site (9.2 ha to the west) comprises worked land which has been restored following coal extraction. The soils generally consist of shallow medium clay loam topsoils over clay subsoils. The upper subsoils are very slowly permeable due to compaction created during soil movement, however with increasing depth (45/55 cm +) this compaction diminishes. Profiles are slightly stony throughout with small coal fragments occurring below 50/70 cms.

Soil Type 2 (refer to Appendix 2 and Soil Map)

4.2.2 Undisturbed clayey profiles cover the remainder of the site (5.3 ha to the east). They typically comprise medium clay loam topsoils (20 cm depth) over gleyed, clay subsoils. The subsoils are slowly permeable, remaining water logged for long periods. Consequently the wetness class has been assessed as IV. Lower subsoils are slightly stony with coal fragments below 50 cms.

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(*1) Dale Association: slowly permeable seasonally waterlogged clayey, fine loamy over clayey and fine silty soils on soft rock, often stoneless.

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1985. Solid edition Geology Sheet 52°N-02°E 1:250,000 scale.

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the Quality of Agricultural Land) Alnwick.

METEOROLOGICAL OFFICE, 1989. Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office.

SOIL SURVEY OF ENGLAND AND WALES, 1983. The Soils of Midland and Western England, Sheet 3 1:250,000 scale.