# PROPOSED EXTENSION TO HICKS LODGE OPENCAST COAL SITE, LEICESTERSHIRE.

## Agricultural Land Classification and Statement of soil physical characteristics

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# AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS REPORT

## PROPOSED EXTENSION, HICKS LODGE OPENCAST COAL SITE, LEICS.

## INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 63 ha of land to the north-east of the village of Donisthorpe, adjacent to the existing workings of the Hicks Lodge Opencast Coal Site. The survey was carried out during March 1999.

2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with a planning application by RJB Mining (UK) Ltd. to extend the existing Hicks Lodge Opencast Coal Site. This survey supersedes previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey the land use within the site consisted predominantly of winter sown cereals. Previously harvested cereal stubble was found in two fields in the west and one field in the north-east of the site.

## SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10 000; it is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

**Table 1: Area of grades and other land**

| Grade/Other land | Area (hectares) | % surveyed area | % site area |
|---|---|---|---|
| 2 | 2.2 | 4 | 4 |
| Subgrade 3a | 2.0 | 3 | 3 |
| Subgrade 3b | 58.4 | 93 | 93 |
| Other land | 0.1 | N/A | neg |
| Total surveyed area | 62.6 | 100 | 100 |
| Total site area | 62.7 | - | 100 |

7. The fieldwork was conducted at an average density of one boring per hectare. A total of sixty two borings and four soil pits was described.

8. The agricultural land within the site has been assessed as predominantly Subgrade 3b (moderate quality agricultural land) with a small area of Subgrade 3a (good quality agricultural land) mapped in the north-west and a small area of Grade 2 (very good quality agricultural land) in the south-west of the site. The limiting factor influencing the quality of the majority of the land is wetness and workability with small areas within the site limited by droughtiness and slope.

## FACTORS INFLUENCING ALC GRADE

### Climate

9. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

10. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5 km grid datasets using the standard interpolation procedures (Met. Office, 1989).

**Table 2: Climatic and altitude data**

| Factor | Units | Values |
|---|---|---|
| Grid reference | N/A | SK 328 148 |
| Altitude | m, AOD | 110 |
| Accumulated Temperature | day°C (Jan-June) | 1345 |
| Average Annual Rainfall | mm | 655 |
| Field Capacity Days | days | 147 |
| Moisture Deficit, Wheat | mm | 100 |
| Moisture Deficit, Potatoes | mm | 89 |
| Overall climatic grade | N/A | Grade 1 |

11. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

12. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

13. The combination of rainfall and temperature at this site impose no overall limitation to land quality and hence the site has a climatic grade of 1.

**Site**

14. The site lies to the south of the existing Opencast Coal Site with a maximum altitude of approximately 110 m AOD in the south-west, north-west and east with generally gentle slopes to the centre of the site which lies at approximately 90 m AOD. In a small area in the north of the site slopes in excess of 7° have been measured. In this area land is limited to subgrade 3b due to a gradient limitation.

**Geology and soils**

15. The published 1:50 000 scale geology map of the area, sheet 155, Coalville, (British Geol. Survey, 1982) shows the site to comprise Carboniferous Westphalian B Coal Measures with Sandstone in the north-east and south-west.

16. The 1:250 000 reconnaissance scale soil survey map for the area (Soil Survey, 1983) shows the site as comprising soils of the Bardsey Association. This soil association is briefly described as slowly permeable seasonally waterlogged loamy over clayey and fine silty soils over soft rock with some well drained coarse loamy soils over harder rock.

17. During the current, more detailed survey, two soil types were identified, and are described below and shown on the attached soil types map.

*Soil Type I (55.3 ha)*

18. This soil type covers the majority of the site and consists of a very slightly stony heavy clay loam, clay or very occasionally a medium clay loam textured topsoil which usually directly overlies a clay textured subsoil. This subsoil is very slightly stony, gleyed and prominently mottled and was found to constitute a slowly permeable layer. Occasionally an upper subsoil of gleyed and mottled heavy clay loam, clay or sandy clay was encountered. Subsoil horizons also occasionally contained sandy lenses or sandy inclusions within the heavier material. Information supplied by RJB Mining (UK) Ltd. within the Environmental Assessment for the proposed extension area shows the south of the site to have been previously disturbed and restored approximately fifty years ago. There is much evidence of previous disturbance within the site, however, the reinstated soils differ little from those of the undisturbed areas and hence the majority of the site has been mapped as a single soil type irrespective of any disturbance. Profiles of this soil type were assessed as poorly drained.

*Soil Type II (7.3 ha)*

19. This soil type occurs in two small areas in the north-west and south-west of the site and consists of a generally shallow profile of slightly stony medium clay loam, sandy clay loam or occasionally a medium sandy loam textured topsoil. This topsoil overlies a slightly stony sandy clay loam, medium sandy loam or loamy medium sand textured upper subsoil which usually overlies hard sandstone rock. This soil type was well drained

## AGRICULTURAL LAND CLASSIFICATION

20. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

21. The location of the auger borings and pits is shown on the attached sample location map.

### Grade 2

22. The small area mapped as Grade 2 in the south-west of the site corresponds to an area of relatively deep profiles of Soil Type II (paragraph 19). These profiles are well drained,(Wetness Class I). However, the moisture available within the soil profile is insufficient to meet the full requirements for plant growth, hence the soil profiles have a slight droughtiness limitation which restricts the area to Grade 2.

### Subgrade 3a

23. Land of Subgrade 3a quality in the north-west of the site is associated with areas of Soil Type II (paragraph 19) in which the well drained soil profiles are relatively shallow or consist of coarse textured materials. These profiles therefore have a moderate droughtiness limitation which restricts the area to Subgrade 3a.

### Subgrade 3b

24. The majority of the site comprises land of Subgrade 3b quality associated principally with Soil Type I (paragraph 18). This soil type is assessed as Wetness Class IV which together with the topsoil textures and the prevailing climatic conditions result in a significant wetness and workability constraint restricting the land to Subgrade 3b. Small areas of the site mapped as Soil Type II (paragraph 19) are restricted to Subgrade 3b by being very shallow and hence having a significant droughtiness limitation. Additionally slopes in excess of 7° limit a small area of Soil Type II in the north of the site to Subgrade 3b.

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## SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No.* 155, *Coalville. Solid and Drift Edition, scale 1:50 000.* BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet* 3, *Midland and Western England.* SSEW: Harpenden.

## APPENDIX I

## DESCRIPTIONS OF THE GRADES AND SUBGRADES

### Grade 1: Excellent Quality Agricultural Land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

### Grade 2: Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural or horticultural crops can usually be grown but on some land of this grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1 land.

### Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2.

### Subgrade 3a: Good Quality Agricultural Land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

### Subgrade 3b: Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass, or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

### Grade 4: Poor Quality Agricultural Land

Land with severe limitations which significantly restrict the range of crops and/or the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

### Grade 5: Very Poor Quality Agricultural Land

Land with severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

**Appendix II**

**Statement of Soil Physical Characteristics**

**Soil Type I**

Topsoil

| | | |
|---|---|---|
| Texture | : | Heavy clay loam or clay, occasionally medium clay loam |
| Colour | : | 2.5Y4/2, dark greyish brown, 2.5Y4/3, olive brown |
| Stones | : | Very slightly stony (typically 3%) |
| Roots | : | Many fine and very fine |
| Calcium carbonate | : | Non calcareous |
| Boundary | : | Abrupt, smooth |
| Depth | : | 31 cm |

Upper subsoil (where present)

| | | |
|---|---|---|
| Texture | : | Clay, occasionally heavy clay loam or sandy clay |
| Colour | : | 2.5Y5/3, light olive brown or 10YR5/3, brown |
| Mottles | : | Many to very many ochreous |
| Stones | : | Very slightly stony (typically 3%) |
| Structure | : | Weakly developed coarse prismatic breaking to coarse angular blocky |
| Consistence | : | Firm to very firm |
| Structural condition | : | Poor |
| Pores | : | <0.5% biopores |
| Roots | : | Common fine |
| Calcium carbonate | : | Non calcareous |
| Boundary | : | Abrupt, smooth |
| Depth | : | 61 cm |

Lower subsoil (or subsoil where upper subsoil absent)

| | | |
|---|---|---|
| Texture | : | Clay (silt) |
| Colour | : | 2.5Y5/3, light olive brown + 10YR5/1, grey |
| Mottles | : | Very many ochreous |
| Stones | : | Very slightly stony (typically 2%) |
| Structure | : | Weakly developed coarse prismatic |
| Consistence | : | Firm |
| Structural condition | : | Poor |
| Pores | : | <0.5% biopores |
| Roots | : | Few fine |
| Calcium carbonate | : | Non calcareous |
| Depth | : | 120 cm |

Wetness Class IV

Appendix II continued

**Soil Type II**

Topsoil

| | | |
|---|---|---|
| Texture | : | Medium clay loam or sandy clay loam, occasionally medium sandy loam |
| Colour | : | 10YR4/2, dark greyish brown |
| Stones | : | Slightly stony (typically 10%), sandstone |
| Roots | : | Many fine |
| Calcium carbonate | : | Non calcareous |
| Boundary | : | Abrupt, smooth |
| Depth | : | 31 cm |

Upper subsoil

| | | |
|---|---|---|
| Texture | : | Sandy clay loam, occasionally medium sandy loam or loamy medium sand |
| Colour | : | 2.5Y6/4, light yellowish brown, 10YR6/6, brownish yellow |
| Mottles | : | None to few |
| Stones | : | Slightly stony (typically 10%) |
| Structure | : | Weakly developed coarse subangular blocky |
| Consistence | : | Very friable |
| Structural condition | : | Moderate |
| Pores | : | >0.5% biopores |
| Roots | : | Common fine |
| Calcium carbonate | : | Non calcareous |
| Depth | : | 55 cm |

Lower subsoil (where present - hard sandstone where not present).)

| | | |
|---|---|---|
| Texture | : | Loamy medium sand or medium sand |
| Colour | : | 10YR6/4, light yellowish brown, 10YR5/4, yellowish brown |
| Mottles | : | None |
| Stones | : | Slightly stony (typically 10%) |
| Structure | : | Single grain |
| Consistence | : | Loose |
| Structural condition | : | Moderate |
| Roots | : | Few fine |
| Calcium carbonate | : | Non calcareous |
| Depth | : | 80 cm (below this depth hard sandstone rock). |

Wetness Class : I