

**EXTENSION TO LANGOR BRIDGE  
QUARRY, NORFOLK**

**VALIDATION SURVEY  
Agricultural Land Classification  
ALC Map and Report**

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**Resource Planning Team  
Eastern Region  
FRCA Cambridge**

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# VALIDATION SURVEY AGRICULTURAL LAND CLASSIFICATION REPORT

## Extension to Langor Bridge Quarry, Norfolk

### INTRODUCTION

1. This report presents the findings of an Agricultural Land Classification (ALC) validation survey of 49ha of land at Langor Bridge Quarry, Norfolk. The survey was carried out during August 1997.
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 an application to extend the existing Langor Bridge Quarry. MAFF surveyed land to the west of the site in 1989 (job No. N/65/89) and assigned the low lying land west of the river to grades 3b, 4 and 5 due to wetness limitations. Also a small area north of the disused railway was assigned to grade 3a, due to a moderate droughtiness limitation. The application area for the new extension was surveyed on behalf of the applicants by Dr S McRae in January 1997. In this survey, land to the immediate east of the river, was assessed as grade 4, suffering from severe wetness. In conjunction with the previous fieldwork this assessment appears logical and no further survey work was considered necessary to confirm the poor quality of this land. Grading of the land to the north and east included grades 3a, 3b and 4. This validation survey was therefore carried out to confirm the consultant's grading of these areas.
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). This survey supersedes previous ALC information for this site. A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey the land use on the site was cereals, linseed and sugar beet.

### 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
3b	26.7	100	54.5
Agricultural land not surveyed	22.3	N/A	45.5
Total site area	49.0	100	100

7. The fieldwork was conducted at an average density of 0.6 auger borings per hectare of surveyed land. A total of 16 auger borings was described. The survey of the northern part of the site was at a detailed level, whilst on the southern part of the site it was approximately semi-detailed. No soil profile inspection pits were dug as the information obtained by augering and topsoil riddling confirmed that the land was of moderate quality.

8. The entire area covered by this validation survey has been graded 3b (moderate quality agricultural land). The northern part of the site is limited to this grade by topsoil stoniness, droughtiness, or equally by both. Land of grade 3a or 4 does occur very sporadically within this area, but it can not be delineated separately at this scale of mapping. In the southern part of the site, the land is restricted to subgrade 3b entirely by droughtiness.

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

**Table 2: Climatic and altitude data**

Factor	Units	Values	
		TF 954 292	TF 959 283
Grid reference	N/A		
Altitude	m, AOD	50	35
Accumulated Temperature	day°C (Jan-June)	1369	1386
Average Annual Rainfall	mm	690	677
Field Capacity Days	days	140	139
Moisture Deficit, Wheat	mm	106	109
Moisture Deficit, Potatoes	mm	98	101
Overall climatic grade	N/A	Grade 1	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 mean the site is relatively warm and dry and therefore has no climatic limitation. Accordingly, it has a climatic grade of 1.

## Site

14. Two distinct parts of the site were surveyed. The northern part is situated south of the A1067 and largely lies on the western flank of a gently sloping hill. The land in this area falls steadily from 53m AOD in the east to approximately 38m AOD on the western boundary. The southern part slopes steadily in a south-westerly direction towards the River Wensum Valley. The area of unsurveyed land is flat and lies on the River valley floor immediately to the east of the river. Nowhere on the areas surveyed do slopes exceed 3°, therefore, neither gradient or altitude impose any limitations on the land quality.

## Geology and soils

15. No detailed geology map exists for this area. At a scale of 1:250 000, the British Geological Survey have mapped the area as being entirely underlain by Cretaceous Upper Chalk.

16. The Soils Survey of England and Wales have mapped the area on two occasions, at the reconnaissance scale of 1:250 000 in 1983, and at 1:100 000 in 1973.

17. The former depicts three Soil Associations. The whole of the northern part of the site is mapped as the Barrow Association. In the southern part of the site, the lower slopes are shown as the Isleham 2 Association whilst the higher land, on the eastern side of this area, is mapped as the Burlingham 1 Association. These soils are described briefly as:-

- Barrow: Deep well drained coarse loamy, coarse loamy over clayey and sandy soils. Some of the latter are very acid and with a bleached subsurface horizon especially in woodlands or on heaths.
- Isleham 2: Deep permeable sandy and peaty soils affected by groundwater. Very complex soil pattern with hummock and hollow microrelief locally. Risk of winter flooding. Risk of wind erosion.
- Burlingham 1: Deep coarse and fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some deep well drained coarse loamy and sandy soils.

18. The latter map delineates the same 3 soil map units, identifying a number of Soil Series within them. These broadly correspond to the above Soil Associations.

19. The current survey identified two main soil types. The first, corresponding to the northern part of the site typically comprises moderately to very stony medium sandy loam topsoils over very slightly to slightly stony loamy medium sand upper subsoils. These merge into very slightly stony medium sands. Due to the very dry soil conditions at the time of the survey, soil profiles frequently became impenetrable to the auger at a shallow depth. Where it was possible to auger to depth, below 75/95cm the textures became heavier, with lenses of clay in the medium sand.

20. The second soil type corresponds to the southern part of the site. Here the soils comprise very slightly to slightly stony loamy medium sands over very slightly stony loamy medium sands extending typically to 50/60cm. The lower subsoils are predominantly very slightly stony medium sands, but very occasionally, comprise loamy medium sand and become moderately to very stony.

## AGRICULTURAL LAND CLASSIFICATION

21. 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.
22. The locations of the auger borings are shown on the attached sample location map.

### *Subgrade 3b*

23. In the north of the site, land is restricted to subgrade 3b by significant topsoil stone and/or droughtiness limitations associated with the soils described in paragraph 19. Typically 20/30% stones >2cm diameter were found in the topsoil. This volume of stones causes excessive wear and tear on cultivation machinery and adversely affects the establishment of crops, therefore restricting the land to subgrade 3b (moderate quality agricultural land). Over the majority of the area, droughtiness was equally limiting or limiting on its own. The coarse soil textures combining with the profile stone content to significantly reduce the available water reserves for plant growth, thereby imposing a significant drought risk which restricts the land to this subgrade.
24. The southern part of the site was constrained to subgrade 3b by a droughtiness limitation associated with the soils described in paragraph 20. The coarse textures of the soils, combined with profile stone content and the high expected moisture deficits prevalent in the area, impose a significant drought risk which precludes the land from a higher grade.

Adrian Rochford  
Resource Planning Team  
Eastern Region  
FRCA Cambridge

## SOURCES OF REFERENCE

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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.

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Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 4, Soils of Eastern England.*  
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Eastern England*  
SSEW: Harpenden

Soil Survey of England and Wales (1973) *Soils of Norfolk.*  
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.