Agricultural Land Classification

Land at Ripon J50 A1(M)
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Summary

The Agricultural Land Classification report of the site known as land at Ripon J50 A1(M) was prepared by Stuart Nicholls of Savills, and Daniel Baird of Daniel Baird Soil Consultancy Ltd, in May 2018. Daniel Baird is an experience soil scientist, applying his knowledge from his BSc. (Hons) Soil and Land Resources degree and MSc in Land Resource Management, coupled with extensive experience in Agricultural Land Classification surveying. Daniel is a full member of the British Society of Soil Scientists.

The area under investigation is proposed for development for a motorway service area. The site totals approximately 13.35 hectares and lies to the west of the motorway junction. All agricultural land was under arable production when surveyed in April 2018, however part of the site was left un-surveyed due to concerns over damage to the growing crop.

The whole site lies at approximately 40m above ordnance datum and is level to gently sloping with a southern aspect. The Soilscape information for the site lists the soil as Type 6, which is described as freely draining slightly acid loamy soils.
Introduction

The purpose of this report is to classify the land at known as ‘Land at Ripon, J50 A1(M)’ according to the extent to which its physical and chemical characteristics impose long term limitations on agricultural use.

The site totals approximately 13.35 hectares of agricultural land to the west of the motorway junction. The site was all in arable production at the time of the survey.

The site centers Grid Reference SE 352 760.

A survey was conducted in April 2018 by Daniel Baird, using a number of hand auger borings and trial pits to a maximum depth of 1.20m to examine soil profiles. The survey followed the standard soil survey protocol, as set out in The Soil Survey Field Handbook (1976), however due to the small size of the site, the standard one sample point per hectare density was doubled by adding sample points at 50m intersections of the OS grid to ensure representative cover. This data was used to assess the principal soil types for determining the Agricultural Land Classification (ALC).

Climatological data was used to determine any overriding site limitations and for interaction with soil parameters. The above information was cross referenced with geological surveys and the national 1:250,000 series ALC survey relevant to the site (see Appendix 1), to substantiate the findings. The ALC Grade was then determined for the site.

Other factors used for ALC grading, but which give no limitation at this site, are not included in this report.

Agricultural land is classified into the following categories according to the 1988 Guidelines.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Excellent quality agricultural land</strong> with no or very minor limitations to agricultural use.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Very good quality agricultural land</strong> with minor limitations which affect crop yield, cultivation, or harvesting.</td>
</tr>
<tr>
<td>3a</td>
<td><strong>Good quality agricultural land</strong> capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.</td>
</tr>
<tr>
<td>3b</td>
<td><strong>Moderate quality agricultural land</strong> with severe limitations which significantly restrict the range of crops and/or level of yields.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Poor quality agricultural land</strong> with severe limitations which significantly restrict the range of crops and/or level of yields.</td>
</tr>
<tr>
<td>5</td>
<td><strong>Very poor quality agricultural land</strong> with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.</td>
</tr>
</tbody>
</table>
Agricultural Land Classification
Land at Ripon J50 A1(M)

Natural England Note TIN049 (Second Edition), published in December 2012, brings together Government guidance from the National Planning Policy Framework (2012) and a white paper entitled “The Natural Choice: Securing the Value of Nature” (2011). Both of these policy documents state that planning authorities should take into account the economic and other benefits of the ‘best and most versatile agricultural land’. The best and most versatile land is deemed to be Grades 1, 2, and 3a, which are capable of growing the widest range of crops and delivering the best yields. The NPPF states that where significant development of the best and most versatile land is necessary, it should be directed to areas with the poorest land.

All of the land within the site falls within the boundary of the Harrogate Local Planning Authority. The current Local Plan for Harrogate was adopted in 2001 and policy C12 concerned the conservation of best and most versatile land. However, this policy was deleted in 2007. Guidance on the conservation of the best and most versatile land therefore reverts to that given in the NPPF.

Based on the wording of the policy guidance, this report will distinguish between sub-grades 3a and 3b.
Methodology

Agricultural Land Classification (ALC) is undertaken in accordance with the Agricultural Land Classification of England and Wales: Guidelines and criteria for grading the quality of agricultural land (Revised guidelines 1988 and Draft second revision 1996, MAFF, London).

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and solid geology. This included consultation of the Soil Survey of England and Wales 1:250,000.

Baseline Conditions

The Agricultural Land Classification Provisional (England) map (1:250,000) published in 1983 by MAFF, indicates that the Land at Ripon J50 A1(M) is grade 2. This was determined from a search of the interactive DEFRA Magic Map using the Land Classification layer (Appendix 1).

The site is not included in the MAFF post 1988 revision which determines sub-grades 3a and 3b at 1:50,000. However land in the vicinity of the site ranges from Grade 2 to Grade 4.

Soilscape information for the site, as published by DEFRA, indicates that there is one soil category present. Table 1 shows the profile description for the soil types.

<table>
<thead>
<tr>
<th>ID</th>
<th>Description</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Freely draining slightly acid loamy soils</td>
<td>Texture: Loamy</td>
</tr>
</tbody>
</table>

http://www.landis.org.uk/soilscapes/soilguide.cfm

The Land Information Service developed by Cranfield University states that Soil type 6 is suitable for a range of spring and autumn sown crops and when under grass, the soils have a long grazing season. Free drainage reduces the risk of soil damage from grazing animals or farm machinery. Shortage of soil moisture is the most likely limiting factor on yields, particularly where the soils are stony or shallow.

The British Geological Survey Geology of Britain Viewer shows the site to be underlain by a solid geology of the Sherwood Sandstone Group, which in turn is covered by glacial till, the Vale of York Formation.

On the basis of the available National Land Classification information the land at Ripon J50 A1(M) Gate is Grade 2.
Climate

Climatological data for ALC are provided for 5km intersections of the National Grid by the Meteorological Office, in collaboration with the National Soil Resources Institute. The data from these points can be interpolated providing climate data for specific sites. Interpolated data for point SE352 760, within the site, is given in Table 2 below.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Units</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altitude AOD</td>
<td>m</td>
<td>38</td>
</tr>
<tr>
<td>Accumulated Temp.</td>
<td>Day °C (Jan-June)</td>
<td>1356</td>
</tr>
<tr>
<td>Moisture Deficit (Wheat)</td>
<td>mm</td>
<td>107</td>
</tr>
<tr>
<td>Moisture Deficit (Potatoes)</td>
<td>mm</td>
<td>98</td>
</tr>
<tr>
<td>Average Annual Rainfall</td>
<td>mm</td>
<td>631</td>
</tr>
<tr>
<td>Field Capacity Days</td>
<td>Days</td>
<td>148</td>
</tr>
</tbody>
</table>

The main parameters used in the assessment of an overall climatic limitation are AAR as a measure of overall wetness, and AT0 as a measure of the warmth of the site in the growing season.

Climate does not impose an overall limitation on ALC grade at this site. Climate does however have an important influence on the interactive limitations, soil wetness and soil droughtiness.
Geology, Topography, and Soils

The site is currently in agricultural use and at the time of the survey the fields were in an arable rotation. The whole site lies at approximately 40m above ordnance datum and is level to gently sloping with a southern aspect.

The Soilscape information for the site lists the soil as Type 6; “freely draining slightly acid loamy soils.”

The British Geological Survey Geology of Britain Viewer shows the site to be underlain by a solid geology of the Sherwood Sandstone Group, which in turn is covered by glacial till, the Vale of York Formation.
Agricultural Land Classification

This survey has resulted in an Agricultural Land Classification of the following grades:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Ha (approx.)</th>
<th>%</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3a</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3b</td>
<td>8.90</td>
<td>67%</td>
<td>Soil droughtiness</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Non-Ag. Land</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Not surveyed</td>
<td>4.44</td>
<td>33%</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>13.34</td>
<td>100%</td>
<td>-</td>
</tr>
</tbody>
</table>

Loamy medium sand topsoils were found on the site and the texture of this material is light enough to exclude the land from Grade 1 as it is vulnerable to structural damage when exposed to raindrop impact. In places the topsoil content of large stones (those retained on 20mm and 60mm sieves) was sufficiently high to limit that land to Grade 3b. Soil profiles were typically light textured topsoil and upper subsoil, with an intermittent heavy textured lower subsoil below 0.5m depth. Soil droughtiness is the dominant limiting factor for ALC Grade at this site. This limitation results from the combination of the limited plant available water held by the light textured soil profile and the climatic factors including rainfall and length of growing season. The presence of large stones in the topsoil is also a limiting factor to Grade 3b in some locations. A sufficient volume of large stones in the topsoil restricts land management options, impairing root and tuber crop growth, hampering the use of some cultivators such as precision drills, and accelerating wear on all cultivators.

Some sample points when taken in isolation, have a lower soil droughtiness limitation placing them in Grade 3a. However these are dispersed across the surveyed area and no contiguous area of Grade 3a land could be discerned at the detailed survey scale. Similarly, some sample points were found to be ALC grade 4, but have not been mapped as a distinct area at the detailed scale.

The land owner was not able to grant access to the area shown as land not surveyed at the time of survey due to concern over potential for damage to the emerging crop. Any future survey of this area may find contiguous areas of Grade 3a and/or Grade 4 land that include an isolated point within the surveyed area. If this case arises the ALC distribution plan will be redrawn to cover the whole of the new survey area.
Conclusion

A review of the national ALC resources and a detailed site survey has determined the land known as ‘Land at Ripon J50 A1(M)’ to be ALC Grade 3b. MAFF describe ALC Grade 3b as “moderate quality agricultural land with severe limitation which significantly restrict the range of crops and/or level of yields.”

Soil droughtiness is the most significant limitation to the agricultural use of the site. To achieve full yield potential, a growing crop requires an adequate supply of soil moisture throughout the growing season. Soil moisture requirements vary considerably between crops and according to growth stage, with the potential demand for moisture rising as leaf cover and therefore transpiration increases. Droughtiness is most likely to be a significant factor in areas of low rainfall, high evapotranspiration or where the soil holds only small reserves of moisture that is available to plant roots.

Soil wetness is the most significant limitation to the agricultural use of the site. The key effect of soil wetness on arable crops is a reduction in yield caused by damage to roots by prolonged periods of saturation. In practical terms, saturated soils also disrupt access with machinery, particularly in the autumn and winter. This can have a significant impact on yield as key establishment and application windows can be missed. For pasture, the key effect of soil wetness is a potential a reduction in yield, caused by damage to roots by prolonged periods of saturation. In practical terms, soil wetness can restrict the length of the grazing season. Waterlogged soils are vulnerable to structural damage from vehicle traffic, cultivation and livestock, which can be costly and time-consuming to remediate. This also further impedes drainage, increasing the risk of additional damage.

The site would therefore not be considered ‘best and most versatile’ land.
Information Sources

Agricultural Land Classification of England and Wales. *Guidance and criteria for grading the quality of agricultural land.* (MAFF, 1988)


Climatological Data for Agricultural Land Classification. (Met Office, 1989).

Agricultural Land Classification Map. 1:250,000 (MAFF, 1983)

Agricultural Land Classification

Land at Ripon J50 A1(M)

Appendix 1 - National ALC Map 1983, Post 1988 Revision, DEFRA Soilscape Map

Land at Ripon J50 A1(M) ALC Provisional (England) 1983

Legend

Agricultural Land Classification - Provisional (England)

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Non-Agricultural
- Urban

Projection = OSGB36
xmin = 354600
xmax = 515800
ymin = 436300
ymax = 515900

Map produced by MAGIC on 29 May, 2018.

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Agricultural Land Classification

Land at Ripon J50 A1(M)

Legend

Post 1988 Agricultural Land Classification (England)

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Not Surveyed
- Other

Map produced by MAGIC on 29 May, 2018.

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Appendix 2 – Auger Boring Locations & Site Specific ALC