



October 2018

Barratt Homes and Bloor Homes North West

Agricultural Land Classification and Soil Resources

at

Holt Road, Wrexham

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1 Introduction

- 1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Barratt Homes and Bloor Homes North West to investigate the Agricultural Land Classification (ALC) and soil resources of land at Holt Road, to the east of Wrexham, by means of a detailed survey of soil and site characteristics.
- 1.2 Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for grading the quality of agricultural land (1988)¹. Guidance is also set out in the Welsh Government's publication 'Agricultural Land Classification - Frequently Asked Questions' (December, 2017), attached as Appendix 1.
- 1.3 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. The principal physical factors influencing grading are climate, site and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.
- 1.4 Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use, and Grade 5 is very poor quality land, with severe limitations due to adverse soil, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Land which is classified as Grades 1, 2 and 3a in the ALC system is defined as best and most versatile agricultural land.
- 1.5 The site extends to approximately 30ha, of which 15.1ha has been surveyed by the Welsh Government in 2014 (attached in Appendix 2). The remainder of the site has been surveyed in detail in September 2018 and the results of the two surveys combined to provide an overall grading for the site.

¹ **MAFF (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.* MAFF Publications.

2 Site and climatic conditions

General features, land form and drainage

- 2.1 That part of the site surveyed in September 2018 is centred on National Grid Reference (NGR) SJ 36253 51562. It is bordered by the A534 along the northern boundary, and by Wrexham to the west.
- 2.2 The site is located on a broadly level slope, with the highest point at an elevation of approximately 78m above Ordnance Datum (AOD) in the northwest (see Figure 1). The lowest elevation occurs in the north-east corner at approximately 70m AOD.
- 2.3 There are no surface water bodies, or river courses on the site. The nearest main river (Nail Bourne) is located at the bottom of a dip slope, at an elevation of approximately 17m AOD, approximately 500m to the north of the site. Agricultural land at the site is not at risk of flooding in the summer or winter, in terms of Tables 2 and 3 of the ALC Guidelines.

Agro-climatic conditions

- 2.4 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point data set for NGR SJ 36253 51562 at a representative altitude of 77m AOD, and are given in Table 1. Climate at the site is moist and moderately cool, with a large number of days when soils are at field capacity and moderate potential moisture deficits. There is however no overriding climatic limitation to agricultural land quality.

Table 1: Local agro-climatic conditions

Parameter	Value
Average Annual Rainfall	770mm
Accumulated Temperatures >0°C	1,388 day°
Field Capacity Days	176 days
Average Moisture Deficit, wheat	97mm
Average Moisture Deficit, potatoes	85mm

Soil parent material and soil type

- 2.5 The underlying geology of the entire site mapped by the British Geological Survey (BGS)² is the Salop Formation (mudstone, sandstone and conglomerate). Superficial deposits of Glaciofluvial Sheet Deposits, Devensian (sand and gravel), overlay the bedrock across the site and comprise the soil parent materials.

² **British Geological Survey (2018).** *Geology of Britain viewer*, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

- 2.6 The Soil Survey of England and Wales (SSEW) soil association mapping³ (1:250,000 scale) indicates that the site is entirely covered by soils grouped in the Newport 1 Association.
- 2.7 The SSEW describe how the soils of the Newport 1 association consist mainly of well drained (Wetness Class I) medium sandy soils formed in glaciofluvial and river terrace deposits and, in a few places, stoneless, aeolian sand. Although widely distributed in England and Wales the association is rarely extensive but in many wetter districts it provides the only well drained, easily-worked soils suitable for arable use. The principal soil is the Newport series, which belongs to the typical brown sands. Other main soils include the well drained, coarse loamy Wick series (typical brown earths) and the sandy Blackwood series (typical sandy gley soils) which is affected by seasonal groundwater where undrained. A typical profile comprises of a dark brown, slightly stony or loamy sand topsoil. The subsoil comprises of a brown, slightly stony loamy sand or sand with a weak fine subangular blocky structure.

3 Agricultural land quality

Soil survey methods

- 3.1 Fifteen soil profiles were examined in September 2018 using an Edelman (Dutch) auger at an observation density of approximately one per hectare in accordance with the established recommendations for ALC surveys. One observation pit was excavated to examine subsoil structures. The locations of observations are indicated on Figure 1. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120 cm or any impenetrable layer, as shown in Appendix 3:
- soil texture;
 - significant stoniness;
 - colour (including localised mottling);
 - consistency;
 - structural condition;
 - free carbonate; and
 - depth.

³ **Soil Survey of England and Wales (1984).** *Soils of Wales* (1:250,000), Sheet 2

- 3.2 One topsoil sample was submitted for laboratory determination of particle size distribution, with the results presented in Appendix 4.
- 3.3 Soil Wetness Class (WC) was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling, and slowly permeable subsoil layers at least 15 cm thick, in relation to the number of Field Capacity Days at the location.
- 3.4 Soil droughtiness was investigated by the calculation of moisture balance equations. Crop-adjusted Available Profile Water (AP) is estimated from texture, stoniness and depth, and then compared to a calculated moisture deficit (MD) for the standard crops wheat and potatoes. The MD is a function of potential evapotranspiration and rainfall. Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs.

Agricultural land classification and site limitations

- 3.5 Assessment of land quality has been carried out according to the MAFF revised ALC guidelines (1988)¹. Soil profiles have been described according to Hodgson (1997)⁴ which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines.
- 3.6 The detailed soil survey determined one main type of soil on the site, which is a deep, well drained (WC I), very slightly to slightly stony (small hard gravel), non-calcareous, brown, loamy medium sandy to medium sandy loam topsoil over upper subsoil of similar texture, overlying medium sand in the lower subsoil. This soil type is comparable with the Newport soils described by the SSEW.
- 3.7 The main limitation to agricultural land quality at this site is soil droughtiness, i.e. a shortage of water in the soil profile during the growing season, which restricts the full yield potential of crops.
- 3.8 The ALC grade according to soil droughtiness is shown in Table 2 below (based on Table 8 'Grade According to Droughtiness' in the ALC Guidelines). To be eligible for Grades 1 to 3b the moisture balances (MBs) must be equal to, or exceed, the stated minimum values for both wheat and potatoes. If the MB for either crop is less (i.e. more negative) than that shown for Subgrade 3b, the soil is Grade 4 on droughtiness:

⁴ **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook*. Soil Survey Technical Monograph No. 5, Silsoe.

Table 2: Grade according to soil droughtiness

Grade	Moisture Balance (MB) Limits (mm)	
	Wheat	Potatoes
1	+30	+10
2	+5	-10
3a	-20	-30
3b	-50	-55
4	<-50	<-55

- 3.9 The deep and well drained loamy medium sand/medium sandy loam soils are limited by soil droughtiness to mainly Subgrade 3a, i.e. MB values of between +5mm and -20mm for wheat, and between -10mm and -30mm for potatoes.
- 3.10 One soil profile is limited by soil droughtiness to Grade 2 (auger location 7) and one soil profile is limited by soil droughtiness to Subgrade 3b (auger location 14). These isolated findings have been included within the predominant and encompassing Subgrade 3a mapping unit.
- 3.11 The quality of agricultural land in two small pockets of land (i.e. immediately south of auger location 1 and between auger location 5 and 6, Figure 1) are limited to Subgrade 3b by gradient, where the angle of slope was measured between 7 and 11 degrees. There are no micro-relief limitations, i.e. where there are complex changes of slope angle and direction over short distances.
- 3.12 The Welsh Government also determined that soil on site typically comprise medium sandy loam textured topsoil overlying a combination of loamy medium sand and medium sand in the subsoil. The soil profiles are well drained (Wetness Class I) and very slightly stony to slightly stony (1-6% by volume). The Welsh Government also classified 13ha as Subgrade 3a due to a soil droughtiness limitation, and 0.7ha as Subgrade 3b due to gradient. The two survey results are consistent with each other in their findings.
- 3.13 The composite distribution of each ALC grade within the site is shown on Figure 2 and in Table 3:

Table 3: Agricultural land classification

Grade	Description	Welsh Government Survey (ha)	RAC survey (ha)	Combined (ha)	%
3a	Good quality	13.0	13.3	26.3	88
3b	Moderate quality	0.7	0.7	1.4	5
Non-agricultural		1.4	0.9	2.3	7

**Appendix 1: Welsh Government's publication 'Agricultural Land Classification
- Frequently Asked Questions' (December, 2017)**

Agricultural Land Classification

Frequently Asked Questions

December 2017



Llywodraeth Cymru
Welsh Government

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General Background Questions

What is the ALC system?

The Agricultural Land Classification (ALC) system provides a method for assessing the quality of farmland in England and Wales. The ALC system classifies land into five grades, with 1 being the best and 5 being the worst and Grade 3 subdivided into Subgrades 3a and 3b. The current grading methodology is described in [The Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land \(MAFF 1988\)](#) sometimes referred to as 'The Blue Book'.

What is agricultural land?

Agricultural land is land which is capable of being used for agricultural purposes (e.g. cropping). The current use of the land does not affect the grade or agricultural potential of the land. Where the potential for agriculture has been irreversibly lost (e.g. through housing development) the land should no longer be classed as agricultural. For planning purposes, it is recommended that the Local Planning Authority is contacted to confirm the status of the land. Also see: [Can land be high grade if it is not cropped or is used for grazing?](#)

What is ALC used for?

The ALC is used to grade the quality of agricultural land so that informed decisions can be made over its future use within the planning system. The planning systems in England and Wales seek to conserve the 'Best and Most Versatile (BMV) agricultural land. Government policies in **Wales** with regard to BMV land can be found on the Welsh Government ALC webpages at: [Welsh Government Web Topic - Agricultural Land Classification](#) BMV policies in **England** are set out in the National Planning Policy Framework.

What is Best and Most Versatile agricultural land?

National planning policy defines the Best and Most Versatile agricultural land as land within grades 1, 2 and 3a. This is good to excellent quality land which can best deliver the food and non-food crops for the future.

How does the Agricultural Land Classification system grade land?

The criteria for grading are based on the long term physical limitations of land for agricultural use, such as **climate** (temperature, rainfall, aspect, exposure and frost risk), **site** (gradient, micro-relief and flood risk) **and soil** (texture, structure, depth and stoniness, and also chemical properties which cannot be corrected), and interactions between these factors such as soil wetness, droughtiness and erosion. Field survey to obtain site and soil data is required. The current grading methodology is described in: [The Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land \(MAFF 1988\)](#)

What do the different grades mean?

Generalised Description of the Agricultural Land Classification Grades

Grade & standard colour notations	Description of agricultural land	Detail
1	Excellent quality	No or very minor limitations on agricultural use. Wide range of agricultural and horticultural crops can be grown. High yielding and consistent.
2	Very good	Minor Limitations on crop yield, cultivations or harvesting. Wide range of crops but limitations on demanding crops (e.g. winter harvested veg). Yield high but lower than Grade 1.
3 (subdivided)	Good to moderate	Moderate limitations on crop choice, timing and type of cultivation, harvesting or level of yield. Yields lower and more variable than Grade 2.
3a	Good	Moderate to high yields of narrow range of arable crops (e.g. cereals), or moderate yields of grass, oilseed rape, potatoes, sugar beet and less demanding horticultural crops.
3b	Moderate	Moderate yields of cereals, grass and lower yields other crops. High yields of grass for grazing/ harvesting.
4	Poor	Severe limitations which restrict range and/or level of yields. Mostly grass and occasional arable (cereals and forage), but highly variable yields. Very droughty arable land included.
5	Very poor	Severe limitations which restrict use to permanent pasture or rough grazing except for pioneering forage crops.

A full description of the grades can be found in [Appendix 1](#).

Can land be high grade if it is not cropped or is used for grazing?

The current land use does not affect the grade or longer term agricultural potential of the land. Land use is an economic and management choice of the land manager. The ALC grade describes what the land is potentially capable of, not what it is currently used for.

Can the ALC grading be changed by farming practices?

Normal agricultural land management will rarely, if ever, affect the ALC grading of land. The grading is based on the long term physical and chemical limitations of land for agricultural use. The current or historic agricultural management, or intensity of use, does not affect the ALC grade. ALC grading could potentially only be improved by very major and expensive interventions, well beyond the scope of normal agricultural works. Examples could include major new drainage schemes, new flood defence systems or infilling / levelling of highly uneven land. It is extremely unlikely that an ALC grading would drop because of neglect or poor agricultural management.

Will fertilizer improve the grade?

Applications of fertiliser or lime are part of the normal management of agricultural land and do not affect the grade. Normal fertiliser levels in the soil have no bearing on ALC grade. Chemical limitations in ALC relate to major long term problems that cannot easily be remediated. These can include extreme acidity, saline environments and presence of toxic elements.

What can I grow on my land? (Crop suitability)

The suitability of land for certain crops is determined by a variety of factors. The ALC Grade of the land doesn't determine what can be grown, but indicates the type of crops that are generally suited to land of that quality and versatility. Typical crops are given in Appendix 1.

Are land values determined by ALC grade?

The ALC system was developed to inform land use planning decisions. The use of the ALC system for land valuation has never been intended and should not be used for this purpose.

Grade and Map Questions

What is the grade of my land?

The only way to accurately determine the agricultural grade of land is by way of a detailed field survey in accordance with the current ALC 1988 guidelines. [What does a detailed field survey involve?](#)

In **Wales**, the Welsh Government holds detailed field survey information for selected areas and a predictive map which can be found at <http://lle.gov.wales/map/alc>. For further information please contact LQAS@wales.gsi.gov.uk.

The most up-to-date information on ALC Grades in **England** can be found on www.Magic.gov.uk/ (Landscape tab). Detailed field surveys (Post 1988 ALC layer on the Magic website) are available for selected areas. Also see: What about strategic maps showing the likely occurrence of best and most versatile land mentioned in [TIN049](#)?

Why do different maps show different grades for the same area?

ALC assessments became more field based and site specific from 1976, partly due to limitations of the Provisional mapping. On 1 January 1989, the current system of ALC grading was introduced: (*The Revised guidelines and criteria for grading the quality of agricultural land*: MAFF 1988). The guidelines provide the most definitive ALC grading and normally supersede any earlier surveys. In some areas there will be several different levels of detail of ALC data. Soils are variable and the grade of the land can vary over small distances. The ability to map this variation depends on the scale of the survey and the associated scale of mapping. The most detailed survey will usually represent the most definitive grading.

What are the 'Revised Guidelines'?

The ALC was devised and introduced in the 1960s and Technical Report 11 (MAFF, 1966: Technical Report 11, Agricultural Land Classification of England and Wales) outlined the national system. Following a review of the system, criteria for the sub-division of Grade 3 (3a, 3b & 3c) were published in 1976 and Technical Report 11/1 (MAFF, 1976: Technical Report 11/1, Agricultural Land Classification of England and Wales. The definition and identification of Sub-grades within Grade 3) outlined the updated.

The new and most up-to-date guidance was issued in 1988 "*The Revised guidelines and criteria for grading the quality of agricultural land*". This was implemented from 1 January 1989. The 1988 Revised guidelines were developed and tested with the aim of updating the system without changing the original concepts. This recognises two subgrades within in Grade 3: Subgrade 3a and Subgrade 3b, the latter being a combination of the previous Subgrades 3b and 3c. Consequently, modern ALC surveys are sometimes referred to as 'post 1988' or post revision. Any surveys carried out using the old guidelines (sometimes referred to as pre 1988 surveys or pre revision) would need to be reassessed under the current criteria.

Survey Related Questions

There is no detailed survey of my land, is a field survey required?

It depends why you want to know the grade of your land. For a planning purpose you should contact your local planning authority for advice.

What does a detailed field survey involve?

ALC surveys are undertaken, according to the published [Guidelines](#) by field surveyors using hand held augers to examine soils to a depth of 1.2 metres. This usually consists of one boring per hectare, supplemented by digging occasional small pits (usually by hand) to inspect the soil profile at representative locations to provide more detailed information about soil conditions to depths up to 1.2 metres. Information obtained by these methods is combined with climatic and other data to produce an ALC map and report, which will normally include individual soil profile and pit descriptions, and written explanations to support the grading applied. ALC maps are normally produced on an Ordnance Survey base at varying scales from 1:10,000 for detailed work to 1:50 000 for reconnaissance survey. It is important that ALC surveys are completed by an experienced ALC surveyor to ensure that the evidence is accurate and robust to inform planning decisions.

Can you recommend an ALC surveyor?

The Institute of Professional Soil Scientists (the professional body of the British Society of Soil Science) maintains a register of competent soil surveyors who have experience of carrying out ALC surveys. www.soils.org.uk. Other professional bodies may also maintain lists of their members who undertake ALC work. It is important that ALC surveys are completed by an experienced ALC surveyor to ensure that the evidence is accurate and robust to inform planning decisions.

Is urban land subject to ALC surveys?

Urban land may be shown on ALC survey maps. It will normally not be surveyed because the land has relatively little potential for return to agricultural use. The full definition of urban and other non-agricultural categories in the ALC system can be found in Appendix 1. You should contact your local planning authority for advice on whether an ALC survey is required to support a planning application.

Does the Welsh Government carry out ALC (detailed field) surveys?

Yes. The Welsh Government does carry out detailed Agricultural Land Classification (detailed field) surveys. These surveys are undertaken largely in response to requests from Local Planning Authorities for individual sites or areas at the urban edge which are being considered for development. The Welsh Government also holds copies of detailed individual Agricultural Land Classification (ALC) surveys carried out by them, as well as the former Welsh Office or Welsh Assembly Government. In addition the Welsh Government also provides a site survey validation service for Local Planning Authorities providing a technical assessment of submitted reports and enables them to fully consider land quality in the decision making process.

Does Natural England carry out ALC surveys?

Natural England provides advice to Local Planning Authorities on ALC matters, but does not carry out ALC field surveys. Natural England holds copies of detailed individual Agricultural Land Classification (ALC) surveys carried out by the former Ministry of Agriculture, Fisheries and Food until the late 1990s. These surveys were undertaken largely in response to requests from Local Planning Authorities for individual sites or areas at the urban edge which were to be considered for development; not all agricultural land was surveyed at the time. There is no longer a national programme to survey all areas in detail and since the late 1990's, the Government no longer undertakes detailed field surveys itself. Specialist consultants are engaged by developers, Local Planning Authorities, landowners and others

to carry out detailed Agricultural land Classification surveys for local plans and other development proposals.

What sampling density should I use in my ALC field survey?

There is no prescribed guidance on the sample density of field surveys; however, most experienced ALC surveyors use an average density of 1 sample point per hectare (carried out on the Ordnance Survey 100m grid). Soil pits are also useful to obtain further information about soil structure, porosity and stone content, rock layers etc. to enable confirmation of the grading found on site. The number of soil pits is difficult to specify in advance of starting field survey work. In general, one soil pit is dug for each of the main grades or soil types on the site, though not necessarily for each map unit, but it should be left to the professional judgement of the surveyor as to the appropriate minimum number required.

Surveys at this detailed level can also enable an assessment of the soil resources in line with the [Defra Code of Practice for the Sustainable Use of Soils on Construction Sites](#) and will allow users to present the land quality case to public inquiry level if required.

Depending upon the type of development, location, scale, purpose of the survey, availability of existing ALC data etc., less detailed surveys (or sometimes more detailed) surveys may be undertaken, but expert advice must be sought from a soil scientist or other practitioner experienced in undertaking ALC survey work. All data captured in ALC surveys is done to the same standard (i.e. standard recording of soil colour, texture etc. plus pits). The only difference in a less detailed survey is the grid spacing, not the quality or detail of data capture at the points examined.

It is important that ALC surveys are completed by an experienced ALC surveyor to ensure that the evidence is accurate and robust to inform planning decisions. The British Society of Soil Scientists run training courses and has a competency scheme, ***Working with Soil***, covering aspects of soil survey and the ALC system.

What climate data is used for ALC?

The definitive climatic data used for assessing the overall climatic limitation (and for the wetness and droughtiness limitations) are obtained from a series of grid point datasets compiled specifically for ALC (Meteorological Office 1989: Climatological Data for Agricultural Land Classification). They provide long term average values of the required variables on a 5km grid covering the whole of England and Wales. These variables are interpolated for the location (grid reference) and altitude for intermediate sites.

I am a consultant/soil scientist undertaking a detailed ALC site survey and the land benefits from irrigation. Should I be taking this into account in my grading assessment?

No. The advice that irrigation should be removed from the ALC assessment was expressed in a consultation on the ALC system in 1996.

APPENDIX 1: AGRICULTURAL LAND CLASSIFICATION (ALC)

Descriptions of the Grades and Subgrades

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics. The grading guidance and cut-offs for limitation factors in the MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land enable land to be ranked in accordance with these general descriptions.

Descriptions are also given of other land categories which may be used on ALC maps.

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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: golf courses, private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports/ airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland. Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (e.g. polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed. Where the land use includes more than one of the above land cover types, e.g. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

Source: Section 2: [MAFF \(1988\) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.](#)

Appendix 2: Welsh Government Agricultural Land Classification – Tyn Twll Farm, Wrexham

**AGRICULTURAL LAND CLASSIFICATION
SURVEY**

TYN TWLL FARM, WREXHAM

AGRICULTURAL LAND CLASSIFICATION SURVEY

TYN TWLL FARM, WREXHAM

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2.2 Site

The majority of the site was gently undulating, with gradient not imposing limitations to agricultural land quality. However, at the north of the site near Tyn Twll Farm, a small area of land was subject to gradients of approximately 8 degrees, imposing moderately severe limitations to agriculture in terms of gradient.

2.3 Soils

Soils on the site were typically composed of medium sandy loam textured topsoils, typically overlying a combination of loamy medium sand and medium sand in the subsoil. Some soil profiles were noted to contain horizons of medium sandy loam texture.

Topsoil stone contents were low, all less than 5% by volume, dominantly in the 2-5 cm size range. This imposed no significant agricultural limitation in terms of topsoil stoniness. Subsoils typically contained low total stone contents, with horizons ranging from 1% to approximately 6% by volume.

2.4 Soil Wetness

Soils fell into Soil Wetness Class I. This, in combination with the topsoil textures present in this range of Field Capacity Days did not render the land subject to agricultural limitations related to soil wetness and workability.

2.5 Droughtiness

Soils at the site were subject to moderate agricultural limitations related to droughtiness. This was primarily due to the effect of the relatively “light” soil textures present, especially the loamy medium sand and medium sand textured subsoils.

AGRICULTURAL LAND CLASSIFICATION SURVEY

TYN TWLL FARM, WREXHAM

1. INTRODUCTION

The original ALC Map covering Wales was published in 1977 at a scale of 1:250 000 (one inch to four miles) and was marked 'provisional'. It shows the survey area to consist of land in Grade 2. The relatively small scale of the map, however, means that it is not accurate for assessment of individual areas of less than approximately 80 ha (200 ac).

In connection with the 2002 Wrexham Local Plan, the area was re-surveyed in April 2002 at a scale of 1:5000. This was to assist in the agricultural evaluation of the site, to provide further information on its ALC grade and to sub-divide any Grade 3 land identified. The survey involved detailed field sampling of soils, together with interpretation of aerial photographs, examination of existing published and unpublished geological², climatic^{3, 4} and soil^{5, 6} data and consultations with fellow Welsh Assembly Government officers.

1.2 Land Use

The site covers approximately 15 ha. At time of survey, April 2002, the majority of the agricultural land was under cereal stubble.

1.3 Geology

The Geological Survey of Great Britain (England and Wales) Sheet 108 (1:50,000 scale) shows the site to be underlain by Glacial Sand and Gravel.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

2.1 Climate

Average interpolated values for each climatic parameter as calculated for this site are listed below:

Altitude	70 m
Average Annual Rainfall (AAR)	762 mm
Median Accumulated Temperature above zero degrees C, January to June (AT0)	1397 Day °C
Median Duration of Field Capacity Days (FCD)	175 Days
Moisture Deficit (Winter Wheat)	98 mm
Moisture Deficit (Potatoes)	87 mm

The favourable combination of the Average Annual Rainfall and Accumulated Temperature values for this site mean that it is not subject to any agricultural limitations in terms of overall climate

3. AGRICULTURAL LAND CLASSIFICATION

Under the MAFF Agricultural Land Classification system, land is graded according to the degree to which certain physical characteristics, in particular climate, relief and soil, impose long-term limitations on agricultural use. A full description of the Classification and of the criteria used in determining the gradings can be found in the published MAFF Report⁷.

The areas of each Grade are delineated on Map 1, the reasons for grading are outlined below:

Subgrade 3a Land has been allocated to this Subgrade as the result of moderate agricultural limitations relating to soil droughtiness.

Subgrade 3b Land has been allocated to this Subgrade as the result of moderately severe agricultural limitations relating to gradient.

Grades 1, 2, 4 and 5 were not present at this site.

Areas of land in each grade

	ha	ac	% Agricultural Land	% Total Land
Subgrade 3a	13.02	32.16	95	86
Subgrade 3b	0.68	1.68	5	5
Total Agricultural Land	13.70	33.84	100	91
Non-agricultural	0.19	0.47	-	1
Agricultural buildings	1.17	2.89	-	8
TOTAL SITE AREA	15.06	37.20	86	100

1. REFERENCES

1. MAFF (1970) 1:63,360 Agricultural Land Classification of England and Wales Maps, Sheet 109, Chester.
2. Geological Survey of Great Britain (1973) 1:50,000 Map Series, Sheet 108: Flint.
3. Meteorological Office (1989) Climatological Data for Agricultural Land Classification. Meteorological Office, Bracknell.
4. MAFF (1984). The Agricultural Climate of England and Wales, Reference Book 435. HMSO London.
5. Soil Survey of England and Wales (1983) 1:250,000 Soil Map Series, Sheet 2: Soils of Wales.
6. Soil Survey of England and Wales (1984) 1:25,000 Sheet SJ35: Wrexham North.
7. MAFF (1988) Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

Drafted: June 2002

Ian Rugg (Welsh Assembly Government)

Finalised: February 2014

Ian Rugg (Welsh Government)

www.pearsoned.com.au

400

400

Total 10

—

Journal of Management Education 33(10)

This information is accurate

This map is based upon the

Sponcy by ARAD, U

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Appendix 3: Soil Profile Logs and Soil Droughtiness Calculations

Point	Grid ref.			Alt (m)	Slope °	Aspect	Land use	Depth (cm)			Matrix	Ochreous Mottles		Grey Mottles		Gley	Texture	Stones - type 1			Stones - type 2			Ped			SUBS STR	CaCO3	Mn C	Drought			Wet		Final ALC			Profile notes
	NGR	X	Y					Top	Bttm	Thick	Munsell colour	Form	Munsell colour	Form	Munsell colour			%	> 2cm	> 6cm	Type	%	> 2cm	> 6cm	Type	Strength				Size	Shape	MBw	MBp	Gd	WC	Gw	Limitation 1	
1	SJ 36000	51700	336000	351700	78	<=7	LEY	0	25	25	7.5YR3/2					No	MSL - Me6	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Not Applic	NON - N	No	No	4	-1	3a	WC I	1	Droughtiness		3a			
								25	50	25	7.5YR4/6					No	MSL - Me16	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								50	120	70	7.5YR5/6					No	MS - Mec20	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
2	SJ 36300	51700	336300	351700	70	<=7	LEY	0	25	25	7.5YR3/3					No	LMS - Lo6	2	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Not Applic	NON - N	No	No	-14	-23	3a	WC I	2	Droughtiness		3a			
								25	60	35	7.5YR4/4					No	MS - Mec1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
3	SJ 36400	51700	336400	351700	70	<=7	LEY	0	23	23	7.5YR3/3					No	LMS - Lo2	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Not Applic	NON - N	No	No	-14	-23	3a	WC I	2	Droughtiness		3a			
								23	58	35	7.5YR4/4					No	MS - Mec1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
								58	120	62	7.5YR5/6					No	MS - Mec1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
4	SJ 36020	51600	336020	351600	73	<=7	LEY	0	30	30	7.5YR3/2					No	LMS - Lo2	0	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-8	-14	3a	WC I	2	Droughtiness		3a			
								30	60	30	7.5YR4/4					No	LMS - Lo6	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	2.5Y4/1					No	MS - Mec8	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
5	SJ 36100	51600	336100	351600	73	<=7	LEY	0	30	30	7.5YR3/2					No	LMS - Lo8	4	1	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-10	-16	3a	WC I	2	Droughtiness		3a			
								30	60	30	7.5YR4/4					No	LMS - Lo6	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	2.5Y4/1					No	MS - Mec10	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
6	SJ 36200	51600	336200	351600	77	<=7	LEY	0	27	27	7.5YR3/2					No	LMS - Lo8	8	0	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-14	-19	3a	WC I	2	Droughtiness		3a		
								27	60	33	7.5YR4/4					No	LMS - Lo12	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec16	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
7	SJ 36300	51600	336300	351600	74	<=7	LEY	0	32	32	7.5YR3/2					No	MSL - Me6	0	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	7	0	2	WC I	1	Droughtiness		2			
								32	70	38	7.5YR4/4					No	LMS - Lo4	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								70	120	50	7.5YR5/6					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
8	SJ 36400	51600	336400	351600	74	<=7	LEY	0	25	25	7.5YR3/2					No	LMS - Lo1	0	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-13	-22	3a	WC I	2	Droughtiness		3a	Loamy medium sand topsoil is not eible for Grade 1 (Table 6 and page 16 of ALC Guildelines (1988)).		
								25	60	35	7.5YR4/4					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
9	SJ 36120	51500	336120	351500	73	<=7	LEY	0	22	22	7.5YR3/2					No	LMS - Lo4	1	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Not Applic	NON - N	No	No	-10	-19	3a	WC I	2	Droughtiness		3a			
								22	50	28	7.5YR4/4					No	LMS - Lo1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
								50	120	70	7.5YR5/6					No	MS - Mec1	0	0	HR - All hard rocks or stones (i.e. those which cannot be scratched w				Moderate	NON - N	No	No											
10	SJ 36200	51500	336200	351500	77	<=7	LEY	0	25	25	7.5YR3/2					No	MSL - Me8	2	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	1	-7	3a	WC I	1	Droughtiness		3a			
								25	60	35	7.5YR4/4					No	LMS - Lo1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
11	SJ 36300	51500	336300	351500	74	<=7	LEY	0	25	25	7.5YR3/3					No	LMS - Lo2	0	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-7	-15	3a	WC I	2	Droughtiness		3a			
								25	60	35	7.5YR4/6					No	LMS - Lo2	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
12	SJ 36400	51500	336400	351500	74	<=7	LEY	0	25	25	7.5YR3/3					No	LMS - Lo8	2	0	GH - Gravel with non-porous (hard) stones				Not Applic	NON - N	No	No	-15	-23	3a	WC I	2	Droughtiness		3a			
								25	60	35	7.5YR4/4					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											
								60	120	60	7.5YR5/6					No	MS - Mec1	0	0	GH - Gravel with non-porous (hard) stones				Moderate	NON - N	No	No											

[illegible]

Mottle form

FF - Few Faint
FD - Few Distinct
FP - Few Prominent
CF - Common Faint
CD - Common Distinct
CP - Common Prominent
MF - Many Faint
MD - Many Distinct
MP - Many Prominent
VF - Very many Faint
VD - Very many Distinct
VP - Very many Prominent

Texture

C - Clay
CHK - Chalk
CS - Coarse Sand
CSL - Coarse sandy loam
CSZL - Coarse sandy silt loam
FP - Fibrous and semifibrous peats
FS - Fine Sand
FSL - Fine sandy loam
FSZL - Fine sandy silt loam
HCL - Clay loam (heavy)
HP - Humified peats
HZCL - Silty clay loam (heavy)
IMP - Impenetrable to roots
LCS - Loamy Coarse Sand
LFS - Loamy fine sand
LMS - Loamy medium sand
LP - Loamy peats
MCL - Clay loam (medium)
MS - Medium Sand
MSL - Medium sandy loam
MSZL - Medium sandy silt loam
MZ - Marine Light Silts
MZCL - Silty clay loam (medium)
OC - Organic clays
OL - Organic loams
OS - Organic sands
PL - Peaty loams
PS - Peaty sands
SC - Sandy clay
SCL - Sandy clay loam
SP - Sandy peats
ZC - Silty clay
ZL - Silt loam

Stone Type

CH - Chalk or chalk stones
FSST - Soft fine grained sandstones
GH - Gravel with non-porous (hard) stones
GS - Gravel with porous stones (mainly soft stone types listed above)
HR - All hard rocks or stones (i.e. those which cannot be scratched with a finger nail)
MSST - Soft, medium or coarse grained sandstones
SI - Soft 'weathered' igneous or metamorphic rocks or stones
SLST - Soft oolitic or dolomitic limestones
ZR - Soft, argillaceous or silty rocks or stones

Ped. Shape

SG - Single grain
GRA - Granular
SAB - Subangular Blocky
AB - Angular Blocky
PRIS - Prismatic
PLAT - Platy
MASS - Massive
NA - N/A

Subsoil Structure Condition

Not Applicable
Good
Moderate
Poor

Soil or Ped. Strength

Loose
Very friable
Friable
Firm
Very firm
Extremely firm
Extremely hard
N/A

Calcareousness

NON - Non-calcareous (<0.5% CaCO₃)
VSC - Very slightly calcareous (0.5 - 1% CaCO₃)
SC - Slightly calcareous (1 - 5% CaCO₃)
MC - Moderately calcareous (5 - 10% CaCO₃)
VC - Very calcareous (>10% CaCO₃)

Ped. Size

VF - Very Fine
F - Fine
M - Medium
C - Coarse
VC - Very Coarse
NA - N/A

Degree of Ped. Development

W - Weak
M - Moderate
S - Strong
NA - Not applicable

Wetness Class

WC I
WC II
WC III
WC IV
WC V
WC VI

ALC Grades

1
2
3a
3b
4
5

Gley

None
Gley
N/A

Appendix 4: Laboratory Results



ANALYTICAL REPORT										
Report Number	29505-18	H 95	READING AGRICULTURAL CONS							
Date Received	02-OCT-2018		BEECHWOOD COURT							
Date Reported	08-OCT-2018		LONG TOLL							
Project	8190		WOODCOTE							
Reference	LAND EAST OF WREXHAM		READING							
Order Number	8190		RG8 0RR							
Laboratory Reference		SOIL407509								
Sample Reference		8								
Determinand	Unit	SOIL								
Coarse Sand 2.00-0.63mm	% w/w	4								
Medium Sand 0.63-0.212mm	% w/w	60								
Fine Sand 0.212-0.063mm	% w/w	15								
Silt 0.063-0.002mm	% w/w	14								
Clay <0.002mm	% w/w	7								
Textural Class **		LmS								
Notes										
Analysis Notes		The sample submitted was of adequate size to complete all analysis requested. The results as reported relate only to the item(s) submitted for testing. The results are presented on a dry matter basis unless otherwise stipulated.								
Document Control		This test report shall not be reproduced, except in full, without the written approval of the laboratory.								
Reported by		** Please see the attached document for the definition of textural classes. Darren Whitbread Natural Resource Management, a trading division of Cawood Scientific Ltd. Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS Tel: 01344 886338 Fax: 01344 890972 email: enquiries@nrm.uk.com								

ADAS (UK) Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

For the *sand*, *loamy sand*, *sandy loam* and *sandy silt loam* classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

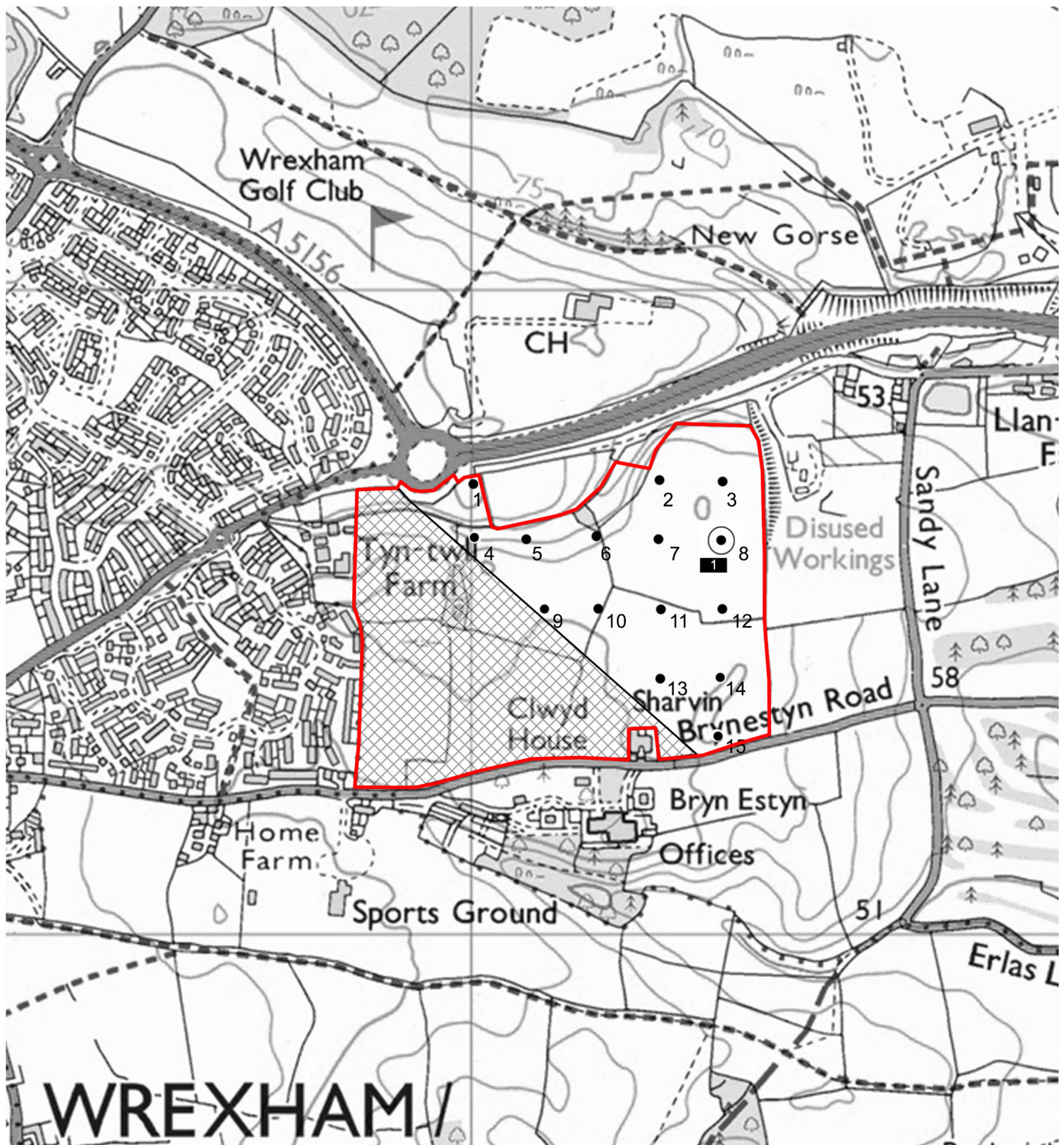
vf	Very Fine (more than 2/3's of sand less than 0.106 mm)
f	Fine (more than 2/3's of sand less than 0.212 mm)
c	Coarse (more than 1/3 of sand greater than 0.6 mm)
m	Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam* classes according to clay content are indicated as follows:

M	medium (less than 27% clay)
H	heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

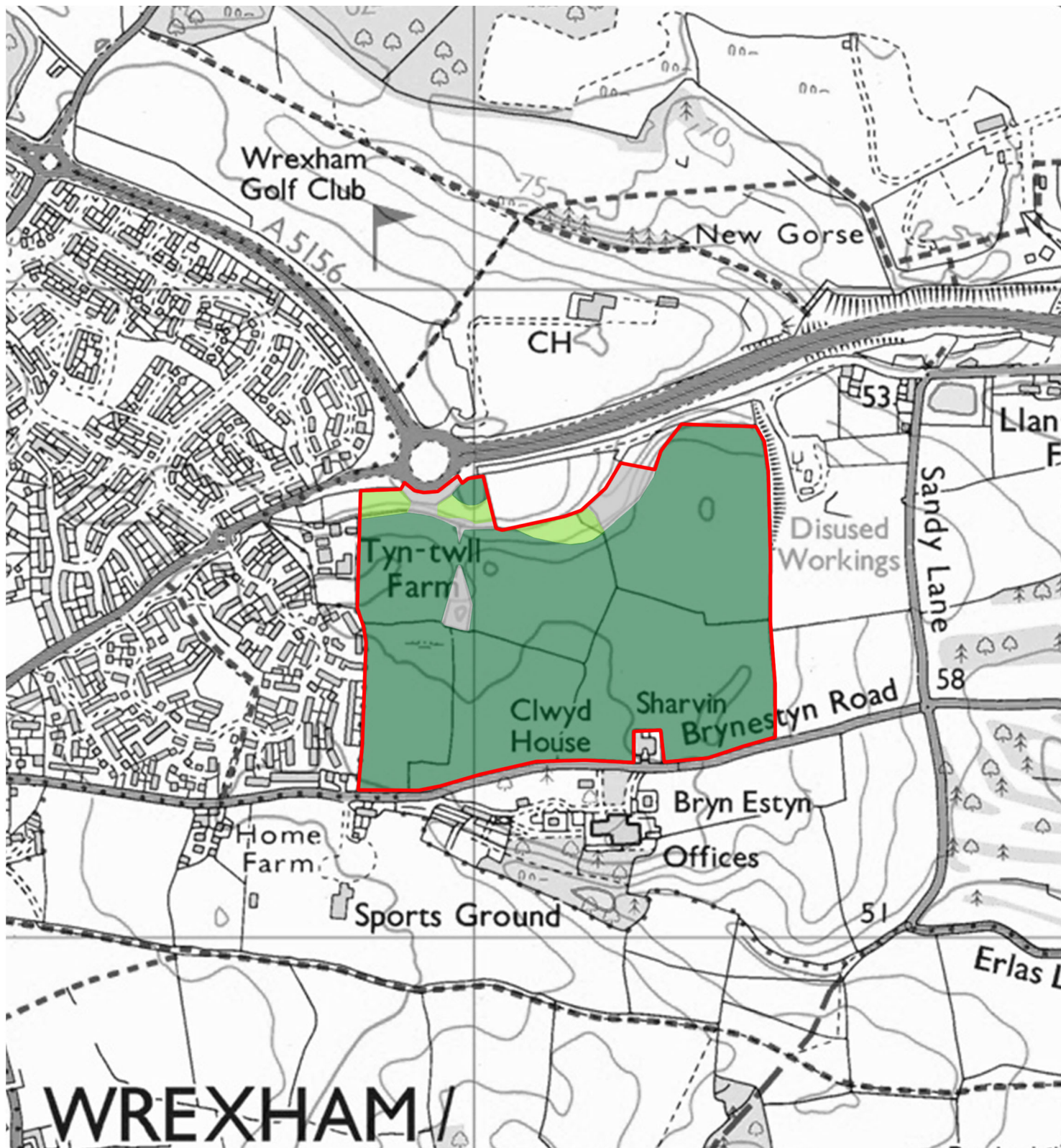
Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.



- Topsoil Samples
- Soil Pit
- 1 ● Auger Locations
- ▨ Area Surveyed by Welsh Government
- Site Boundary

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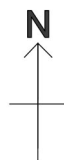
Drawing title	Ref.	Rev.	Reading Agricultural Consultants Ltd Gate House Beechwood Court Long Toll Woodcote RG8 0RR 01491 684233 www.readingagricultural.co.uk  READING AGRICULTURAL CONSULTANTS		
Sample Locations	8190	01			
Contract	Drawn by	Checked by			
Land East of Wrexham	RWA	AF			
	Scales	Date	Rev.	Comment	Date
	NTS	22/10/2018			



ALC Grade

- | | | |
|--|---|--|
|  Grade 1 |  Subgrade 3b |  Other/Non-Agric. |
|  Grade 2 |  Grade 4 |  Site Boundary |
|  Subgrade 3a |  Grade 5 | |

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Drawing title Agricultural Land Classification	Ref. 8190	Rev. 01				Reading Agricultural Consultants Ltd Gate House Beechwood Court Long Toll Woodcote RG8 0RR 01491 684233 www.readingagricultural.co.uk
Contract Land East of Wrexham	Drawn by RWA	Checked by AF				
	Scales NTS	Date 22/10/2018	Rev.	Comment	Date	

 **READING
AGRICULTURAL
CONSULTANTS**