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WASTE RESOURCE MANAGEMENT

BUNTINGFORD (EAST HERTFORDSHIRE)

HALLAM LAND MANAGEMENT

AGRICULTURAL LAND CLASSIFICATION

MAY 2024

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HALLAM LAND MANAGEMENT

AGRICULTURAL LAND CLASSIFICATION

MAY 2024

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BM12665-001 Agricultural Land Classification Map

1 INTRODUCTION

1.1 Background

1.1.1 Wardell Armstrong LLP (WA) has been commissioned by Hallam Land Management to undertake an Agricultural Land Classification (ALC) survey on a 50.1 hectare (ha) parcel of land to the west of Buntingford (hereafter referred to as 'the Site'). This will support the Planning Application for the proposed residential development.

1.1.2 Due to a change to the Site Boundary after the completion of an ALC survey, a 5.12 ha area in the north-west of the Site remains unsurveyed. This report presents the ALC survey results for the Survey Boundary and makes a prediction for the ALC grade of the unsurveyed area, based on Provisional ALC data and extrapolation of ALC grades from the adjacent survey points within the Survey Boundary.

1.1.3 The Site Boundary and Survey Boundary are shown in *Drawing BM12665-001*.

1.2 Site Description

1.2.1 The Site is located within the administrative areas of East Herts District Council and Hertfordshire County Council. The Site falls within post code SG9 9RH and is accessed from the A507 in the south and Throcking Lane in the north (both located off the A10). The Site is approximately 1 km west of Buntingford town centre, and 30 km south-west of Cambridge city centre. The Site is comprised of three agricultural fields separated by hedgerows.

1.2.2 Surrounding land includes agricultural fields immediately around most of the Site. The eastern part is flanked by the A10 road and the Buntingford Business Park.

1.2.3 A survey was carried out between the 14th and 15th of November 2023. Weather conditions during the survey varied between overcast skies and light rain to blue skies. Photograph 1 below shows the conditions on site at the time of the survey.

Photograph 1: Overview of the site during the survey in November 2023.

1.3 Definitions

1.3.1 The ALC system was devised by the Ministry of Agriculture, Fisheries and Food (MAFF) (1988)[1] and is the standard method for determining the quality of agricultural land in England and Wales according to its versatility, productivity and workability, based upon inter-related parameters including climate, relief, soil characteristics and drainage. ALC assesses land quality based upon the type and level of agricultural production the land can potentially support.

1.3.2 The ALC places land into one of five grades: Grade 1 (excellent); Grade 2 (very good); Grade 3 (good to moderate) which is divided into Subgrades 3a (good) and 3b (moderate); Grade 4 (poor); and Grade 5 (very poor).

[1] MAFF (1988). The Agricultural Land Classification (ALC) of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land. Available at: http://publications.naturalengland.org.uk/publication/6257050620264448 Accessed December 2023.

1.3.3 Best and most versatile (BMV) agricultural land is defined as land of excellent to good agricultural quality (ALC Grades 1, 2 and Subgrade 3a) and is afforded a degree of protection in the National Planning Policy Framework (NPPF), 2023[2].

1.3.4 Soil series are the lowest category in the soil classification system and are precisely defined based upon particle-size distribution, parent material (substrate) type, colour, and mineralogical characteristics. Soil Associations are groupings of related soil series.

2 METHODOLOGY

2.1 Desk Study

2.1.1 Information about the soils and agricultural land present on the Site was obtained from the following published sources:

- MAFF (1993). 1:250,000 'Provisional Agricultural Land Classification'[3].
- Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales[4].
- Soil Survey of England and Wales (1984) Soils and their Use in South-East England, with accompanying 1: 250,000 map, Sheet 6[5].
- OS (2021) Terrain 5 Digital Terrain Modelling[6].
- Multi-Agency Geographical Information for the Countryside (MAGIC)[7].
- Google Maps including Streetview[8].
- Cranfield University (2015). Research to develop the evidence base on soil erosion and water use in agriculture[9].

[2] Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework (NPPF). Available at: National Planning Policy Framework - GOV.UK (www.gov.uk) Accessed December 2023.
[3] Provisional Agricultural Land Classification Maps and Data. Available at: https://data.gov.uk/dataset/952421ec-da63-4569-817d-4d6399df40a1/provisional-agricultural-land-classification-alc Accessed December 2023.
[4] Met Office (1989) Climatological Data for Agricultural Land Classification (ALC): Grid point datasets of climatic variables at 5 km intervals for England and Wales. Available at: https://data.gov.uk/dataset/8a334958-ff65-4f5c-9674-5a85e61ee269/climatological-data-for-agricultural-land-classification Accessed December 2023.
[5] Soil Survey of England and Wales (1984) Soils and their Use in South-East England, with accompanying 1: 250,000 map (Sheet 6). Not available online.
[6] OS Terrain 5. Available at: https://www.ordnancesurvey.co.uk/business-government/products/terrain-5 Accessed December 2023.
[7] HM Government. Multi-Agency Geographical Information for the Countryside (MAGIC). Available at: www.magic.gov.uk
[8] Google Maps (©2021). Available at: https://www.google.co.uk/maps/ Accessed December 2023.
[9] Knox *et al.* (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147' Available at https://www.theccc.org.uk/wp-content/uploads/2015/06/Cranfield-University-for-the-ASC.pdf Accessed December 2023.

- Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land – Strategic scale map London and South-East region[10].
- UK Government (2023) Flood Risk for Planning Map[11].
- Munsell (2010) Colour Charts[12].

2.2 Site Survey

2.2.1 A soil survey was undertaken from the 14th to the 15th of November 2023 by three experienced soil surveyors using a combination of augured soil cores and soil profile pits.

2.2.2 Auger cores were taken using a 70 mm diameter hand-held Edelman auger, capable of sampling to a maximum depth of 120 cm. The soil profile pits were excavated, using a spade to a maximum depth of 120 cm, sufficient to evaluate the *in-situ* structure of the soil profile.

2.2.3 A total of 47 points (43 cores and 4 pits) were inspected. As shown on *Drawing BM12665-001*, the survey points were distributed across the Site, giving a survey density of more than one point per hectare in the areas of agricultural land for detailed ALC survey. The scope of the survey is above the recommendations set out in standard survey and ALC guidance and methodology[13]. The purpose of the survey was to provide details of soil profile characteristics and to inform the ALC assessment. The full results of the survey are provided in the appendices.

2.2.4 To confirm the soil texture across the Site, ten soil samples from five points were sent for analysis of particle size distribution and other determinants (organic matter, pH, phosphorus, potassium, and magnesium). Two of the topsoil samples were also analysed for their neutralising value (as % $CaCO_3$ and CaO eq.) to test for the presence of calcareous soils throughout the site. The samples were analysed by NRM Laboratories, which is accredited by UKAS to the internationally recognised standard for competence; ISO/IEC 17025. The laboratory results are included in Appendix 2.

[10] Natural England (2017) Likelihood of Best and Most Versatile (BMV) Agricultural Land - Strategic scale map London and South-East region(ALC019) Available at: http://publications.naturalengland.org.uk/category/5208993007403008 Accessed December 2023.
[11] HM Government. Flood Risk for Planning Map. Available at : https://flood-map-for-planning.service.gov.uk/ . Accessed: December 2023
[12] Munsell Colour (2010). Munsell Soil Colour Charts. Not available online.
[13] Natural England (2012) Agricultural Land Classification; protecting the Best and Most Versatile agricultural land. Available at: http://publications.naturalengland.org.uk/file/4424325 Accessed December 2023.

3 DESK STUDY

3.1 Soils

3.1.1 The scale of the Soil Survey of England and Wales (1984) mapping is such that it is not accurate to the field level and does not pick up small-scale local variations in soil type. However, it does provide a general indication of the soil types within the Site and the wider area.

3.1.2 The Soil Survey of England and Wales (1984) indicates the Site lies in an area of the Hanslope (411d) and Melford (571o) soil associations. A summary of the characteristics of these soil associations is provided in Table 1.

Table 1: The Soil Associations based on the Soil Survey of England and Wales (1984).

Soil Association	411d Hanslope	571o Melford
Geology	Chalky till	Chalky till
Soil Series	Hanslope, Faulkbourne, Ragdale, Beccles, Ashley	Melford, Weasenham, Marlow, Barrow, Ashley, Burlingham, Wighill
Soil characteristics	The Hanslope soil association is generally found on low plateaux and gently to strongly sloping valley flanks. Both the main soils of the series (Hanslope and Faulkbourne) are clayey to the surface and have slowly permeable subsurface horizons. Hanslope soils have a calcareous, chalky subsurface horizon that is normally brown but can be grey mottled, passing into a dense mottled substrate containing chalk stones. Faulkbourne soils are similar but have brown decalcified upper horizons.	The Melford soil association consists of loamy over clayey soils developed over thin chalky till at the margins of till plateaux. It is typically found on gentle and moderate slopes where the till and locally-derived Head thin out over permeable chalk or glaciofluvial deposits. Most component soils have permeable stony subsoils (chalk) overlying glaciofluvial sands and gravels or chalk. Where the till is thicker, the subsoils are slowly permeable and are grey with ochreous mottles (Ashley, Burlingham and Wighill soil series).
Soil Water Regime	Hanslope soils have slowly permeable subsoil horizons. Despite this, they are seldom seriously waterlogged and waterlogging at shallow depth is brief in duration. These soils are responsive to drainage and can be improved from Wetness Class III to II in drier regions (FCD less than 125).	The main soil series (Melford, Weasenham, Marlow and Barrow) are permeable and well drained (Wetness Class I), although the series associated with thicker till are occasionally waterlogged (Wetness Class II). Soil moisture reserves available for crop growth are moderate. The main soils are slightly or moderately droughty in average years for cereal crops, sugar beet and oilseed rape, moderately droughty for potatoes, and very droughty for grass.
Erodibility	Slight risk of water erosion	Low risk of water erosion.

3.2 Agricultural Land Classification

3.2.1 The Provisional 1:250,000 ALC mapping indicates that the Site contains Grade 2 (very good quality) agricultural land, with Grade 3 (good to moderate quality) land also present in the surrounding area. As with the soil associations data, the scale of the mapping is not accurate at the field level, and this is reflected by the inability to pick up variations in ALC grade for areas less than approximately 80 ha. However, it does provide an indication of the predominant ALC grading in the wider area.

3.2.2 There was no detailed post-1988 reconnaissance ALC survey data for the Site. The nearest ALC survey was conducted c. 10 km north of the Site at Royston and found the site to be a combination of Grade 2 (very good quality), Subgrade 3a (good quality) and 3b (moderate quality) agricultural land.

3.2.3 The Natural England BMV Likelihood mapping show the Site to be in an area of high (>60% area BMV) likelihood BMV.

3.3 Aerial Imagery and Ordnance Survey Mapping

3.3.1 The Ordnance Survey mapping indicates that the Site has no visible limitations, with elevation ranging from 110 m to 130 m above sea level across the Site. Individual fields within the Site are separated by hedgerows.

4 SITE SURVEY

4.1 Soil Profile Description

4.1.1 Two distinct soil types were found across the site, the profiles of which displayed features indicative of Hanslope (*4.11*) and Faulkbourne (*4.31*) soils, the main constituent series of the Hanslope association (*411d*) previously recorded in the area by the Soil Survey of England and Wales (1984).

Hanslope series (4.11)

4.1.2 This was found at higher ground in the southern and western parts of the site. Typically, the topsoil was a dark greyish brown (10YR 4/2), calcareous clayey topsoil, with moderate to strong development and medium sized subangular blocky peds. No mottling or gleyed features were observed within the topsoil.

4.1.3 Underlying the topsoil was a chalky clay horizon which was greyish or pale and occasionally mottled. The colour ranged from grey (10YR 6/1), light grey (10YR 7/1 and 7/2) and light brownish grey (10YR 6/2) to pale brown (10YR 6/3), light yellowish

brown (10YR 6/4) and brown (10YR 5/3). The structure was subangular to angular blocky, with moderately to strongly developed medium sized peds.

4.1.4 The upper subsoil transitioned into a mottled grey (10YR 5/1 and 10YR 6/1), light grey (10YR 7/1 and 10YR 7/2), or light brownish grey (10YR 6/2) lower subsoil. The stone content (<2cm chalk fragments) varied from very slightly (1-5%) to slightly (6-15%) stony. The predominant texture of this layer was clay and the structure typically consisted of medium-sized subangular to angular blocky peds, with weak to moderate development. The consistence of this horizon was variable, with points ranging from friable to very firm.

(a) (b)

Photograph 2: Hanslope series soil profile characteristics from pit 13 (a) and auger point 22 (b).

Faulkbourne series (4.31)

4.1.5 Further down the slope in the northern and eastern part of the site, the soil transitioned into a profile more closely resembling the Faulkbourne series.

4.1.6 The topsoil was typically a dark brown (10YR 4/3) to dark greyish brown (10YR 4/2) clayey soil with a subangular blocky structure and medium sized peds. Laboratory analysis supported by tests in the field indicated the presence of calcareous topsoil throughout the site, contrary to the typical profile of this series. This can likely be attributed to the gradual transition from one soil type to another, along with the effect of cultivation and soil erosion on the transport of calcareous material down the slopes.

4.1.7 Below the topsoil was a clayey upper subsoil horizon which varied in colour, with greyish brown (10YR 5/2), pale brown (10YR 6/3), light yellowish brown (10YR 6/4), yellowish brown (10YR 5/4), brown (10YR 5/4) and reddish brown (5YR 5/4) recorded. The chalk content was typically lower than in the Hanslope series profile described above, resulting in coarser ped sizes and poorer structure.

4.1.8 The upper subsoil overlaid a chalky light grey (10YR 7/1) to grey (10YR 6/1) clayey substrate which varied in depth depending on topography. This horizon was weakly to moderately developed with medium to coarse sized angular blocky peds.

(a)

(b)

Photograph 3: Faulkbourne series soil profile characteristics from pit 30 (a) and auger point 74 (b).

5 LIMITATIONS

5.1 Agroclimatic Limitations

5.1.1 Agroclimatic data were taken from the nearest meteorological stations and interpolated to obtain site specific values (Table 2). This was used to establish whether the agricultural land quality of the Site is limited by climate and, in conjunction with soil profile characteristics, wetness and droughtiness.

5.1.2 There is no limitation to agricultural land classification at the Site due to climate.

Table 2: Interpolated agroclimatic data for the Site.	
Average annual rainfall (mm)	625
Accumulated Temperature (^{0}C)	1344
Field Capacity Duration (FCD) (days)	127
Moisture Deficit Wheat (mm)	103
Moisture Deficit Potatoes (mm)	92

5.2 Site Limitations

5.2.1 Gradient did not exceed 7^o at any sampling point and therefore does not pose a limitation to the quality of agricultural land.

5.2.2 There was no small-scale variation in topography therefore microrelief did not limit the ALC grading on the site.

5.2.3 Environment Agency data indicate that the majority of the surveyed area has a very low flood risk. A small area of Flood Zone 3 is found in the south-western tip of the surveyed area adjacent to Thistly Vale Brook[14]. Due to the small extent of this area in relation to the wider site, flood risk was not deemed to be limiting and this area would not need to be managed differently to the surrounding land. The application boundary for the residential development has been sited to avoid this area of Flood Zone 3.

5.3 Soil Limitations

5.3.1 Topsoil stoniness limited one survey point (point 48) to a maximum Grade of 2.

5.3.2 Otherwise, there were no direct soil limitations (soil depth, texture, and topsoil stoniness) which limited the ALC grade at the Site.

5.4 Interactive Limitations

5.4.1 Wetness was the main limitation onsite resulting in an ALC grading of Grade 2 and Subgrade 3a. Soil wetness can adversely affect plant growth and can inhibit the development of a good root system. It also reduces the workability of soils for a longer period during wetter seasons.

5.4.2 Differences in Wetness Class were found due to variation in the depth at which gleying and a slowly permeable layer were found. This was strongly influenced by subsoil texture, subsoil structure, and the depth to the chalky lower subsoil layer encountered. The resulting variation in ALC Grade according to Wetness was then

[14] HM Government. Flood Risk for Planning Map. Available at : https://flood-map-for-planning.service.gov.uk/ . Accessed: December 2023

determined by topsoil texture. Table 3 provides the Grade according to Wetness for the different wetness classes and topsoil textures found on site.

Table 3 - Grade according to Wetness for soils with calcareous topsoils and an FCD of 127

Wetness Class	Texture of the top 25cm	Grade According to Wetness	Survey Point
I	HCL	2	10, 11, 12, 20, 46, 48, 100
	HZCL	2	47, 63
	C	2	13
	SC	2	28
II	HCL	2	21, 22, 23, 32, 33, 43, 59, 77
	HZCL	2	19, 40, 41, 42, 61, 62, 71
	C	3a	57, 72, 73, 74
	SC	3a	9
III	HCL	3a	18, 29, 30, 31, 44, 75, 76, 85, 86, 87
	HZCL	3a	60
	C	3a	45, 56, 58, 84

5.4.3 Most Grade 2 points showed gleyed features within 70 cm of the surface but no slowly permeable layers within 80 cm, apart from a few limited exceptions. This, along with the calcareous topsoils and 127 FCDs, resulted in a wetness class of either I or II.

5.4.4 Most Subgrade 3a points showed gleyed features within 40 cm of the surface and a slowly permeable layer within 80 cm, with only a few points where this was not the case. This, along with the calcareous topsoils and 127 FCDs resulted in wetness classes of II to III. These points were typically found on the lower slopes where the chalky layer was deeper in the profile, resulting in coarser peds at shallower depths in the subsoil.

5.4.5 Droughtiness provisionally limited 15 points to a maximum Grade 2 and one to Subgrade 3a. This was caused by the presence of stones in the lower subsoil which restricted auger boring and therefore the recorded depth of the soil profile. Due to the lithology of the stones on the Site (predominantly soft chalk), this stony horizon can also retain water to some extent, and when factored into the droughtiness calculations, the impact on crop water supply is alleviated and therefore removed as the main limitation to quality of agricultural land.

5.5 Overall Agricultural Land Classification

5.5.1 Grade boundaries were drawn based on field observations and the calculations from the individual points to make mapping units (groups of ALC gradings) representative of field conditions. The ALC map comprises Grade 2 and Subgrade 3a agricultural land.

5.5.2 A 5.12 ha area in the north-west of the Site remains unsurveyed due to a boundary change after the ALC survey was completed. For the purposes of this report, it is assumed that this area consists entirely of Grade 2 agricultural land, based on the Provisional ALC data and extrapolation of ALC grades from the adjacent survey points within the Survey Boundary.

5.5.3 A description of each grade is provided below. A summary of the ALC gradings for the Site Boundary is shown in Table 4, and an illustration of the ALC grading is presented as *Drawing BM12665-001*.

Grade 2

Soils of wetness class I-II with a calcareous, heavy clay loam to heavy silty clay loam topsoil overlying clay subsoils. These soils displayed some signs of gleying within 70 cm of the surface but had no slowly permeable layer with 80 cm. They were typically located on the upper slopes where the depth to a chalky subsoil horizon was shallower. These soils are limited by wetness which would impact upon crop performance and soil workability, although this limitation is ameliorated by the calcareous nature of the soil.

Subgrade 3a

Soils of wetness class II-III, with calcareous heavy textured clay loam, heavy textured silty clay loam or clay topsoils overlying clay subsoils. These soils showed gleying within 70 cm of the surface and a slowly permeable layer within 80 cm, resulting in a main limitation of soil wetness. Subgrade 3a land was located on the lower slopes where the depth to the chalky subsoil horizon was greater, resulting in coarser subsoil peds.

Table 4: Summary of ALC within the Site Boundary.		
ALC or other land category	**Area (ha)**	**Percentage %**
Grade 2 (very good)	24.42	48.7
Provisional Grade 2 (very good)	5.12	10.2
Subgrade 3a (good)	18.91	37.7
Non-agricultural	1.68	3.4
Total	50.13	100

6 POLICY AND GUIDANCE

6.1 National Planning Policy

6.1.1 Under Section 15 of the NPPF[15] (2023): Conserving and enhancing the natural environment, Paragraph 180 states that planning policies and decisions should contribute to and enhance the natural and local environment by:

a) *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*

b) *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*

e) *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans*; and

f) *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate*.

6.1.2 The footnote to Paragraph 181 also states that '*Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality*'.

[15] Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework (NPPF). Available at: National Planning Policy Framework - GOV.UK (www.gov.uk) Accessed December 2023.

6.1.3 The Planning Practice Guidance (PPG) which accompanies the NPPF is split into a number of guidance notes. Guidance on soils and agricultural land is found in the Planning Practice Guidance for the Natural Environment 2019 (PPGNE)[16] under the heading *Agricultural Land, Soil and Brownfield Land of Environmental Value*. This advises that the ALC be used to assess the quality of farmland to enable informed choices to be made about its future use within the planning system; and explains that the ALC places agricultural land into five Grades with Grade 3 subdivided into 3a and 3b. The BMV land is defined as Grades 1, 2 and 3a. The PPGNE states that *'Planning policies and decisions should take account of the economic and other benefits of the best and most versatile agricultural land'.*

6.1.4 The PPGNE goes on to state that 'In the circumstances set out in Schedule 4 paragraph (y) of the Development Management Procedure Order 2015[17], Natural England is a statutory consultee: '*a local planning authority must consult Natural England before granting planning permission for large-scale non-agricultural development on best and most versatile land that is not in accord with the development plan'* and refers to Natural England guidance to assessing development proposals on agricultural land, 2018.

6.1.5 Therefore, knowledge of the ALC grading of the Site, is necessary to be able to determine whether the requirements of planning policy are being met.

6.1.6 The PPGNE also recognises soil as an essential natural capital asset that provides important ecosystem services, for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution. It also recommends Defra's Code of Practice for the Sustainable Use of Soils on Construction Sites[18] as a useful tool when setting planning conditions for development sites, as it provides advice on the use and protection of soil in construction projects, including the movement and management of soil resources.

[16] Planning Practice Guidance for the Natural Environment 2019 (PPGNE) Available at: https://www.gov.uk/guidance/natural-environment

[17] HM Government (2015). Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015. Available at https://www.legislation.gov.uk/uksi/2015/595/contents/made Accessed: January 2023.

[18] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb13298-code-of-practice-090910.pdf Accessed: January 2023.

6.2 Local Planning Policy

6.2.1 The East Hertfordshire Council District Plan [19] was adopted in October 2018 and includes agricultural land policies which reflect the NPPF. Agricultural land use and the potential impact of development upon this is considered as part of the policies on the rural economy and landscape character.

6.3 Guidance

6.3.1 Natural England Technical Information Note 49 (TIN049)[20], promotes the use of ALC for assessing the quality of agricultural land, to ensure informed choices are made about its future use within the planning system. It advocates the use of soil survey to inform environmental assessment. TIN049 states that where development is proposed on agricultural or other potential crop producing land, if that proposed development is not for agricultural purposes and is not in accordance with the provisions of a development plan, and involves the direct or cumulative loss of more than 20 ha of BMV agricultural land, Natural England must be consulted in accordance with the Schedule 4, paragraph (y) of the Statutory Instrument 2015 No. 595[21].

6.3.2 Natural England's Guide to assessing development proposals on agricultural land 2018 (NE; 2018)[22] sets out the government policies and legislation which developers and local planning authorities (LPA) should refer to when considering development proposals that affect agricultural land and guidance on when Natural England should be consulted on development proposals. It also provides a detailed explanation of the ALC, information on published ALC resources and explains circumstances in which new detailed surveys may be required. It also explains how ALC data should be used in the assessment of planning decisions. Importantly, the guidance states that the LPA should ensure that development proposals include plans to protect soils; that where insufficient data are available, new surveys should be undertaken to better inform the planning decision; and that these surveys should be carried out by soil scientists or

[19] East Hertfordshire Council (2018) East Herts District Plan. Available at: https://cdn-eastherts.onwebcurl.com/s3fs-public/documents/District_Plan_Publish_web_view.pdf. Accessed: January 2023.
[20] Natural England (2012). Technical Information Note 049, 'Agricultural Land Classification: protecting the Best and Most Versatile agricultural land'. Available at http://publications.naturalengland.org.uk/publication/35012
[21] Statutory Instrument 2015 No. 595, The Town and Country Planning (Development Management Procedure) (England) Order 2015, Schedule 4, Part (y).
[22] Natural England (2018). Guide to assessing development proposals on agricultural land . Accessed on 16/08/2019. Available at: https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land

experienced soil specialists. The guidance also summarises the required survey methodology (also presented in TIN049).

7 CONCLUSION

7.1.1 The soils within the Site consisted of a calcareous clayey topsoil overlying a clay upper subsoil and a chalky clay lower subsoil. Wetness classes on the Site varied from I to III.

7.1.2 The Provisional ALC mapping identifies the agricultural land within the Site as Grade 2 (very good quality). Natural England's BMV Likelihood mapping indicates a High Likelihood (>60% area BMV) of BMV presence across the whole site. Post 1988 data for land c. 10 km north of the site contained a combination of Grade 2, Subgrade 3a (good) and Subgrade 3b (moderate) quality.

7.1.3 The main limitation at the site was soil wetness due to the heavier textured soils present. Variation in wetness classes was primarily caused by the depth to the chalky lower subsoil. The high chalk content of this horizon resulted in improved subsoil structure, and as a result, deeper slowly permeable layers relative to points where this horizon occurred deeper in the profile.

7.1.4 Topsoil stoniness limited one point to a maximum grade of 2. There were no other soil, agroclimatic or site-specific factors which limited ALC grading on the Site.

7.1.5 The ALC survey of the Site showed that it contains close to equal proportions of Grade 2 (24.69 ha, 56.6%) and Subgrade 3a agricultural land (18.93 ha, 43.4%).

7.1.6 A further 5.12 ha (10.2%) of land that was not included within the ALC survey but now falls within the Site following a boundary change is assumed to be Grade 2 quality, based on Provisional ALC data and extrapolation of ALC grades from adjacent survey points within the ALC Survey Boundary.

APPENDICES

APPENDIX 1: SOIL SURVEY RECORD

APPENDIX 1 Soil Survey Record and ALC

Legend for non-self-explanatory terms:

Horizons - number of different horizons identified within the profile
Type - type of sample, auger core or soil profile pit dug using a spade
Depth - depth to the bottom of the (horizon number) horizon in cm
Texture - C - clay, ZC - silty clay, SC - sandy clay, CL - clay loam, SCL - sandy clay loam, ZCL - silty clay loam, SL - sandy loam, LS - loamy sand, S - sand;
CL and ZCL textures are subdivided into medium (M) and heavy (H) classes according to clay content, as follows: M medium (less than 27 % clay), H heavy (27-35 % clay); F, M and C refer to fine, medium and coarse, respectively, and are subdivisions of S, LS, SL, and SZL textures; O - organic, P - peat or peaty, HP - humified (highly decomposed peat), FP - fibrous peat, SFP - semi-fibrous peat; MZ - marine light silts
Matrix (main) colour - dominant colour of the soil; **Hue** - Munsell colour hue; **Value** - Munsell colour value; **Chroma** - Munsell colour chroma
Mottling - spots and blotches of different colour than the dominant matrix colour
Ped faces - surfaces of the primary soil fragments into which the soil naturally breaks up upon excavating
FeMn - ferri-manganifeours concertions
Biopores - 'yes' if >0.5 % biopores greater than 0.5 mm diameter present (by area)
Stones > 2 cm up to % - maximum percentage of 2 - 6 cm diameter stones
Stones > 6 cm up to % - maximum percentage of > 6 cm diameter stones
Type - H - All hard rocks or stones (those which cannot be scratched with a finger nail); SS - Soft, medium or coarse grained sandstones; SIM - Soft 'weathered' igneous or metamorphic rocks or stones; SL - Soft oolitic or dolomitic limestones; SFS - Soft fine-grained sandstones; SAZ - Soft, argillaceous or silty rocks or stones; CH - Chalk or chalk stones; GRH - Gravel[1] with non-porous (hard) stones; GRS - Gravel[1] with porous stones (mainly soft stone types listed);1 - Gravel with at least 70% rounded stones by volume
Structure type - SG - single grain; GR - granular; SAB - subangular blocky; AB - angular blocky; PR - prismatic; PL - platy; MAS - massive
Dev - Development, how well the structure is developed; W - weak; M - moderate; S - strong
Consistence - Soil consistence (strength); L - loose; VFR - very friable; FR - friable; FIR - firm; VFIR - very firm; EXFIR - extremely firm; EXHD - extremely hard
Gley - depth to gleying
SPL - depth to slowly permeable layer
Wetness Class - classification of the soil according to the depth and duration of waterlogging in the soil profile, the higher the class, the longer and at the shallower depth the soil is wet

Pattern Limitations – Where there are isolated points of ALC Grades on the ALC map, these have been incorporated into surrounding map units. This is indicated in the ALC Map Variation Column.

*Isolated point of Grade 2 – appears as Subgrade 3a on the ALC map

** Isolated point of Subgrade 3a – appears as Subgrade 2 on the ALC map

Overall ALC - this part of the table combines results of the classification for each of the limitations

| Soil profile descriptions | | |

| Soil profile descriptions | | |

| Soil profile descriptions | | | | | | | | | | | | | | | | | | | | | | Soil profile descriptions continued | | | | | | | | | | | | | | | | | | |

APPENDIX 2: LABORATORY DATA

ANALYTICAL REPORT

Report Number	**12045-23**	**H448**	**WARDELL ARMSTRONG LLP**	**Client**	**SURVEY ALC**
Date Received	**22-NOV-2023**		**CITY QUADRANT**		
Date Reported	**30-NOV-2023**		**11 WATERLOO SQUARE**		
Project	**BM12665BMEM**		**NEWCASTLE UPON TYNE**		
Reference	**GRUFFYDD JONES**		**NE1 4DP**		
Order Number	**CA11602**				

Laboratory Reference		**SOIL666773**	**SOIL666774**	**SOIL666775**	**SOIL666776**	**SOIL666777**
Sample Reference		**POINT 6 H1**	**POINT 13 H1**	**POINT 57 H1**	**POINT 69 H1**	**POINT 79 H1**
Determinand	**Unit**	**SOIL**	**SOIL**	**SOIL**	**SOIL**	**SOIL**
pH water [1:2.5]		8.4	8.2	8.1	8.2	8.2
Available Phosphorus (Index)	mg/l	18.2 (2)	22.0 (2)	21.2 (2)	40.8 (3)	37.2 (3)
Available Potassium (Index)	mg/l	154 (2-)	264 (3)	195 (2+)	274 (3)	199 (2+)
Available Magnesium (Index)	mg/l	57.0 (2)	60.5 (2)	60.1 (2)	83.2 (2)	60.4 (2)
Textural Class		Clay	Clay	Clay	Clay Loam	Clay Loam
Sand 2.00-0.063mm	% w/w	24	26	28	31	40
Silt 0.063-0.002mm	% w/w	38	37	36	36	32
Clay <0.002mm	% w/w	38	37	36	33	28
Organic Matter LOI	% w/w	4.9	5.8	5.7	6.4	5.9
Neutralising Value as CaCO3 eq.	% w/w	19.2	11.5	12.4	6.8	2.5
Neutralising Value as CaO eq.	% w/w	10.8	6.4	7.0	3.8	1.4

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

Teresa Clyne

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Supporting a safer, healthier planet
www.cawood.co.uk

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : 0191 232 0943

H448

Please quote the above code for all enquiries

Client : BM12665BMEM
SURVEY ALC

Distributor : CA11602

Local Rep : GRUFFYDD JONES

Telephone :

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 75256/23

Date Received 22-Nov-23
Date Reported 14-Dec-23

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
395306/23	1	**POINT 6 H2** *No cropping details given*	**8.4**	**0**	**0**	**0**	**3.0**	**43**	**20**
395307/23	2	**POINT 6 H3** *No cropping details given*	**8.3**	**0**	**0**	**0**	**2.8**	**48**	**23**
395308/23	3	**POINT 16 H2** *No cropping details given*	**7.8**	**0**	**1**	**2**	**4.0**	**106**	**51**
395309/23	4	**POINT 48 H1** *No cropping details given*	**8.0**	**3**	**2-**	**2**	**29.8**	**158**	**74**
395310/23	5	**POINT 57 H2** *No cropping details given*	**8.4**	**0**	**0**	**1**	**<2.5**	**50**	**28**
395311/23	6	**POINT 59 H2** *No cropping details given*	**7.6**	**0**	**1**	**2**	**4.8**	**83**	**100**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by *Joe Cherrie* On behalf of NRM Date *14/12/23*

ANALYSIS REPORT

DATE **14th December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

Report Reference: 75256/23

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Lab Ref.	Field Details		Soil Organic Matter [LOI%] Result
	No.	Field Name or Reference	
395306	1	POINT 6 H2	1.7
395307	2	POINT 6 H3	1.7
395308	3	POINT 16 H2	3.5
395309	4	POINT 48 H1	5.9
395310	5	POINT 57 H2	1.7
395311	6	POINT 59 H2	4.0

Your Organic Matter Results Interpretation

Land use	Rainfall	Soil type	Very Low	Low	Target	High
Arable	Low <650mm	Light	<=1.0	1.1-2.1	2.2-3.2	>=3.3
		Medium	<=1.7	1.8-3.3	3.4-5.0	>=5.1
		Heavy	<=2.2	2.3-4.4	4.5-6.5	>=6.6
	Moderate 650-800mm	Light	<=1.0	1.1-3.0	3.1-4.5	>=4.6
		Medium	<=1.9	2.0-4.0	4.1-6.0	>=6.1
		Heavy	<= 2.7	2.8-5.2	5.3-7.6	>=7.7
	High 800-1100mm	Light	<=1.3	1.4-3.7	3.8-6.1	>=6.2
		Medium	<=2.5	2.6-5.0	5.1-7.5	>=7.6
		Heavy	<=3.6	3.7-6.2	6.3-8.8	>=8.9
Grassland (Lowland)	All	Light	<=2.1	2.2-4.9	5.0-7.9	8.0-14.9
		Medium	<=3.4	3.5-6.4	6.5-9.3	9.3-19.9
		Heavy	<=4.6	4.7-7.6	7.7-10.5	10.6-19.9

ANALYSIS REPORT

DATE **14th December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

Report Reference: 75256/23

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Explanatory Note: Cropping

High	Above average and associated with crop residues returns and regular OM inputs, including ley-arable rotations. Organic and conservation agricultural systems would appear in this group.	On target --- **Continue Rotational Monitoring**
Typical	Typical levels and is associated with crop residue returns and regular OM inputs, such as cover crops, compost or FYM.	
Low	Lower than average associated with intensive cropping & few organic matter inputs. Plan to add OM inputs and retain crop residues in the field. **Be aware: changes in SOM as a result of a change in practice can take a long time.**	Lower than average --- **Review**
Very Low	Very low associated with very intensive cropping and very few organic matter returns. Plan to regularly add OM inputs and retain crop residues in the field. **Be aware: changes in SOM as a result of a change in practice can take a long time.**	Very Low --- **Investigate**

Explanatory Note: Grassland Fields [Lowland]

High	Above average for the climate and soil type. Well drained, near neutral pH, well managed returns through grazing and inputs. Be aware that high levels could suggest an accumulation of undecomposed SOM near the soil surface due to a deteriorating pH and drainage, for example due to compaction.	On target --- **Continue Rotational Monitoring**
Typical	Typical for the climate and soil type. Associated with well drained near neutral pH, well managed returns through grazing and inputs.	
Low	Lower than average for the climate and soil type, intensively managed or recently reseeded and/or low OM inputs. If the soil is compacted and regularly poached by livestock, then OM soil incorporation by biological activity will have been reduced.	Lower than average --- **Review**
Very Low	Very low for climate/soil type. Intensively managed or recently reseeded and/or very low OM inputs. If the soil is compact and regularly poached by livestock, then OM incorporation by biological activity will have been reduced. Add more OM inputs to build SOM levels.	Very Low --- **Investigate**

Traffic light system: These advisory categories only apply to mineral soils. The benchmarks **are not appropriate for peats/ organic soils, i.e. soils with >20% organic matter to 40cm depth.**

In grassland situations only: SOM results >=15% on light & >=20% on med/heavy soil types suggest accumulation at the soil surface often indicating poor biological activity due to soil acidity or wetness on mineral soils.

Cropping & grassland: There is no defined **critical SOM value to aim for,** feeding the soil with organic inputs is more important than reaching an absolute target value.

Please note: A different set of benchmarks would also be required for upland grass and semi-natural systems.

OM = Organic Matter, **SOM** = Soil Organic Matter

Reference: ADHB-BBRO Soil Biology & Soil Health Partnership protocol and benchmarking document July 2022. Rainfall categories for the SOM benchmarks in AHDB report:91140002 final report 02.pdf (windows.net) see pages 7-11, based on work originally in Defra project SP0310

MICRO NUTRIENT REPORT

DATE **14th December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Reference: **75256/395306/23**	Field Name: **POINT 6 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		15	
Silt (0.063 - 0.002mm) %		31	
Clay (< 0.002mm) %		54	
Textural Classification		Clay	**1**

Reference: **75256/395307/23**	Field Name: **POINT 6 H3**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		19	
Silt (0.063 - 0.002mm) %		31	
Clay (< 0.002mm) %		50	
Textural Classification		Clay	**1**

Reference: **75256/395308/23**	Field Name: **POINT 16 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		27	
Silt (0.063 - 0.002mm) %		36	
Clay (< 0.002mm) %		37	
Textural Classification		Clay	**1**

Reference: **75256/395309/23**	Field Name: **POINT 48 H1**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		34	
Silt (0.063 - 0.002mm) %		33	
Clay (< 0.002mm) %		33	
Textural Classification		Clay Loam	**1**

Reference: **75256/395310/23**	Field Name: **POINT 57 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		4	
Silt (0.063 - 0.002mm) %		32	
Clay (< 0.002mm) %		64	
Textural Classification		Clay	**1**

Reference: **75256/395311/23**	Field Name: **POINT 59 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		35	
Silt (0.063 - 0.002mm) %		35	
Clay (< 0.002mm) %		30	
Textural Classification		Clay Loam	**1**

Notes (*)

(1) In calcareous soils the sand, silt and clay sized fractions are likely to contain particles of carbonate which may result in the incorrect classification of soil type.

ANALYSIS REPORT

DATE	14th December 2023
SAMPLES FROM	BM12665BMEM, SURVEY ALC
SAMPLED BY	GRUFFYDD JONES CA11602
Report reference	75256/23

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943
Fax:

Fertiliser Recommendations

The phosphate and potash recommendations shown below, are those required to replace the offtake and maintain target soil indices. The larger recommended applications for soils below target index will allow the soil to build up to this target index over a number of years. Not applying fertiliser to soils which are above target index will allow the soil to run down over a number of years to the target index.
The recommendation should be increased or decreased where yields are substantially more or less than that specified. The amount to apply can be calculated using the expected yield and values for the offtake of phosphate and potash per tonne of yield given in the RB209 9th edition.
All recommendations are given for the mid-point of each Index.
Where a soil analysis value (as given by the laboratory) is close to the range of an adjacent Index, the recommendation may be reduced or increased slightly taking account of the recommendation given for the adjacent Index. Small adjustments of less than 10 kg/ha are generally not justified.
Efficient use of P and K is most likely to be achieved on soils that are well structured and enable good rooting.
For visual evaluation of soil structure (VESS), a score on 1 or 2 would be considered adequate.
Don't forget to deduct nutrients applied as organic manures.
For Nitrogen recommendations please refer to the RB209 9th edition or seek advice from an FACTS qualified adviser.
Target Indices:
Arable, Forage, Grassland and Potato Crops: P Index 2, K Index 2-
(In rotations where most crops are Autumn-sown, soils are in good condition and P is applied annually, high index 1 can be an adequate target.)
Vegetables and Bulbs: P Index 3, K Index 2+
(If vegetables are only grown occasionally as part of an arable rotation, it would be most economic to target index 2 for arable and forage crops.)
Fruit Vines and Hops: P Index 2, K Index 2, Mg Index 2
(Note: Cider apples respond to K Index 3, Mg Index 3)
A lime recommendation is usually for a 20cm depth of cultivated soil or a 15cm depth of grassland soil. Where soil is acid below 20 cm and soils are ploughed for arable crops, a proportionately larger quantity of lime should be applied. However, if more than 10 t/ha is needed, half should be deeply cultivated into the soil and ploughed down, with the remainder applied to the surface and worked in.
For established grassland or other situations where there is no, or only minimal soil cultivation, no more than 7.5 t/ha of lime should be applied in one application.
In these situations, applications of lime change the pH below the surface very slowly. Consequently, the underlying soil should not be allowed to become too acidic because this will affect the root growth and thus limit nutrient and water uptake, which will adversely affect yield.

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
POINT 6 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
395306 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
POINT 6 H3	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
395307 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
POINT 16 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
395308 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
POINT 48 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
395309 / Medium		*Kg/Ha*				*Te/Ha*	**0**	**0**
Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime*	*(Arable)*	*(Grass)*
POINT 57 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac*	**0**	**0**
395310 / Heavy		*Kg/Ha*				*Te/Ha*	**0**	**0**

Fertiliser recommendations are based on **AHDB RB209 (Ninth Edition).** If a nutrient is deficient and no recommendation is given, either no recommendation is given in RB209 or we have insufficient data to give a recommendation. Apply Lime to the nearest half Ton / Tonne.
NRM is a UKAS accredited laboratory to ISO/IEC 17025

Report continued.....

ANALYSIS REPORT

DATE	14th December 2023
SAMPLES FROM	BM12665BMEM, SURVEY ALC
SAMPLED BY	GRUFFYDD JONES CA11602
Report reference	75256/23

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943
Fax:

Fertiliser Recommendations

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 59 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395311 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

Fertiliser recommendations are based on **AHDB RB209 (Ninth Edition).** If a nutrient is deficient and no recommendation is given, either no recommendation is given in RB209 or we have insufficient data to give a recommendation. Apply Lime to the nearest half Ton / Tonne.
NRM is a UKAS accredited laboratory to ISO/IEC 17025

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : 0191 232 0943

H448

Please quote the above code for all enquiries

Client : BM12665BMEM
SURVEY ALC

Distributor : CA11602

Local Rep : GRUFFYDD JONES

Telephone :

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 75257/23

Date Received 22-Nov-23
Date Reported 01-Dec-23

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
395312/23	1	**POINT 30 H1** *No cropping details given*	**6.5**	**3**	**2+**	**3**	**26.6**	**188**	**140**
395313/23	2	**POINT 30 H2** *No cropping details given*	**7.9**	**0**	**1**	**2**	**5.6**	**100**	**87**
395314/23	3	**POINT 79 H2** *No cropping details given*	**8.1**	**0**	**2-**	**1**	**5.4**	**121**	**32**
395315/23	4	**POINT 13 H2** *No cropping details given*	**8.1**	**0**	**2-**	**2**	**5.0**	**138**	**55**
395316/23	5	**POINT 69 H2** *No cropping details given*	**7.8**	**0**	**2-**	**2**	**4.4**	**130**	**61**
395317/23	6	**POINT 48 H2** *No cropping details given*	**8.5**	**2**	**1**	**0**	**17.0**	**78**	**21**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by *Sandy Cameron* On behalf of NRM Date *01/12/23*

ANALYSIS REPORT

Contact : WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP
Tel. : 0191 232 0943

H448

Please quote the above code for all enquiries

Client : BM12665BMEM
SURVEY ALC

Distributor : CA11602

Local Rep : GRUFFYDD JONES

Telephone :

Sample Matrix : Agricultural Soil

Laboratory Reference
Card Number 75257/23

Date Received 22-Nov-23
Date Reported 01-Dec-23

SOIL ANALYSIS REPORT

Laboratory Sample Reference	Field Details			Index			mg/l (Available)		
	No.	Name or O.S. Reference with Cropping Details	Soil pH	P	K	Mg	P	K	Mg
395318/23	7	**POINT 59 H1** *No cropping details given*	**7.8**	**2**	**2-**	**3**	**20.4**	**151**	**104**

If general fertiliser and lime recommendations have been requested, these are given on the following sheets.
The analytical methods used are as described in DEFRA Reference Book 427
The index values are determined from the AHDB Fertiliser Recommendations RB209 9th Edition.

Released by Sandy Cameron On behalf of NRM Date 01/12/23

ANALYSIS REPORT

DATE **1st December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

Report Reference: 75257/23

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Lab Ref.	Field Details		Soil Organic Matter [LOI%] Result
	No.	Field Name or Reference	
395312	1	POINT 30 H1	7.1
395313	2	POINT 30 H2	4.0
395314	3	POINT 79 H2	4.7
395315	4	POINT 13 H2	3.8
395316	5	POINT 69 H2	4.5
395317	6	POINT 48 H2	1.9
395318	7	POINT 59 H1	6.4

Your Organic Matter Results Interpretation

Land use	Rainfall	Soil type	Very Low	Low	Target	High
Arable	Low <650mm	Light	<=1.0	1.1-2.1	2.2-3.2	>=3.3
		Medium	<=1.7	1.8-3.3	3.4-5.0	>=5.1
		Heavy	<=2.2	2.3-4.4	4.5-6.5	>=6.6
	Moderate 650-800mm	Light	<=1.0	1.1-3.0	3.1-4.5	>=4.6
		Medium	<=1.9	2.0-4.0	4.1-6.0	>=6.1
		Heavy	<= 2.7	2.8-5.2	5.3-7.6	>=7.7
	High 800-1100mm	Light	<=1.3	1.4-3.7	3.8-6.1	>=6.2
		Medium	<=2.5	2.6-5.0	5.1-7.5	>=7.6
		Heavy	<=3.6	3.7-6.2	6.3-8.8	>=8.9
Grassland (Lowland)	All	Light	<=2.1	2.2-4.9	5.0-7.9	8.0-14.9
		Medium	<=3.4	3.5-6.4	6.5-9.3	9.3-19.9
		Heavy	<=4.6	4.7-7.6	7.7-10.5	10.6-19.9

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Explanatory Note: Cropping

High	Above average and associated with crop residues returns and regular OM inputs, including ley-arable rotations. Organic and conservation agricultural systems would appear in this group.	On target --- **Continue Rotational Monitoring**
Typical	Typical levels and is associated with crop residue returns and regular OM inputs, such as cover crops, compost or FYM.	
Low	Lower than average associated with intensive cropping & few organic matter inputs. Plan to add OM inputs and retain crop residues in the field. **Be aware: changes in SOM as a result of a change in practice can take a long time.**	Lower than average --- **Review**
Very Low	Very low associated with very intensive cropping and very few organic matter returns. Plan to regularly add OM inputs and retain crop residues in the field. **Be aware: changes in SOM as a result of a change in practice can take a long time.**	Very Low --- **Investigate**

Explanatory Note: Grassland Fields [Lowland]

High	Above average for the climate and soil type. Well drained, near neutral pH, well managed returns through grazing and inputs. Be aware that high levels could suggest an accumulation of undecomposed SOM near the soil surface due to a deteriorating pH and drainage, for example due to compaction.	On target --- **Continue Rotational Monitoring**
Typical	Typical for the climate and soil type. Associated with well drained near neutral pH, well managed returns through grazing and inputs.	
Low	Lower than average for the climate and soil type, intensively managed or recently reseeded and/or low OM inputs. If the soil is compacted and regularly poached by livestock, then OM soil incorporation by biological activity will have been reduced.	Lower than average --- **Review**
Very Low	Very low for climate/soil type. Intensively managed or recently reseeded and/or very low OM inputs. If the soil is compact and regularly poached by livestock, then OM incorporation by biological activity will have been reduced. Add more OM inputs to build SOM levels.	Very Low --- **Investigate**

Traffic light system: These advisory categories only apply to mineral soils. The benchmarks **are not appropriate for peats/ organic soils, i.e. soils with >20% organic matter to 40cm depth.**

In grassland situations only: SOM results >=15% on light & >=20% on med/heavy soil types suggest accumulation at the soil surface often indicating poor biological activity due to soil acidity or wetness on mineral soils.

Cropping & grassland: There is no defined **critical SOM value to aim for,** feeding the soil with organic inputs is more important than reaching an absolute target value.

Please note: A different set of benchmarks would also be required for upland grass and semi-natural systems.

OM = Organic Matter, **SOM** = Soil Organic Matter

Reference: ADHB-BBRO Soil Biology & Soil Health Partnership protocol and benchmarking document July 2022. Rainfall categories for the SOM benchmarks in AHDB report:91140002 final report 02.pdf (windows.net) see pages 7-11, based on work originally in Defra project SP0310

MICRO NUTRIENT REPORT

DATE **1st December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

WARDELL ARMSTRONG LLP
CITY QUADRANT
11 WATERLOO SQUARE
NEWCASTLE UPON TYNE
NE1 4DP

Tel: 0191 232 0943

Reference: **75257/395312/23**	Field Name: **POINT 30 H1**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		31	
Silt (0.063 - 0.002mm) %		34	
Clay (< 0.002mm) %		35	
Textural Classification		Clay Loam	1

Reference: **75257/395313/23**	Field Name: **POINT 30 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		26	
Silt (0.063 - 0.002mm) %		38	
Clay (< 0.002mm) %		36	
Textural Classification		Clay	1

Reference: **75257/395314/23**	Field Name: **POINT 79 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		44	
Silt (0.063 - 0.002mm) %		26	
Clay (< 0.002mm) %		30	
Textural Classification		Clay Loam	1

Reference: **75257/395315/23**	Field Name: **POINT 13 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		26	
Silt (0.063 - 0.002mm) %		35	
Clay (< 0.002mm) %		39	
Textural Classification		Clay	1

Reference: **75257/395316/23**	Field Name: **POINT 69 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		17	
Silt (0.063 - 0.002mm) %		38	
Clay (< 0.002mm) %		45	
Textural Classification		Clay	1

Reference: **75257/395317/23**	Field Name: **POINT 48 H2**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		12	
Silt (0.063 - 0.002mm) %		33	
Clay (< 0.002mm) %		55	
Textural Classification		Clay	1

Reference: **75257/395318/23**	Field Name: **POINT 59 H1**	**Result**	**(*)**
Sand (2.00 - 0.063mm) %		37	
Silt (0.063 - 0.002mm) %		32	
Clay (< 0.002mm) %		31	
Textural Classification		Clay Loam	1

Report continued.....

MICRO NUTRIENT REPORT

DATE **1st December 2023**

SAMPLES FROM **BM12665BMEM, SURVEY ALC**

WARDELL ARMSTRONG LLP
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11 WATERLOO SQUARE
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Tel: 0191 232 0943

Notes (Continued)

Notes (*)

(1) In calcareous soils the sand, silt and clay sized fractions are likely to contain particles of carbonate which may result in the incorrect classification of soil type.

ANALYSIS REPORT

DATE	1st December 2023
SAMPLES FROM	BM12665BMEM, SURVEY ALC
SAMPLED BY	GRUFFYDD JONES CA11602
Report reference	75257/23

WARDELL ARMSTRONG LLP
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Fax:

Fertiliser Recommendations

The phosphate and potash recommendations shown below, are those required to replace the offtake and maintain target soil indices. The larger recommended applications for soils below target index will allow the soil to build up to this target index over a number of years. Not applying fertiliser to soils which are above target index will allow the soil to run down over a number of years to the target index.
The recommendation should be increased or decreased where yields are substantially more or less than that specified. The amount to apply can be calculated using the expected yield and values for the offtake of phosphate and potash per tonne of yield given in the RB209 9th edition.
All recommendations are given for the mid-point of each Index.
Where a soil analysis value (as given by the laboratory) is close to the range of an adjacent Index, the recommendation may be reduced or increased slightly taking account of the recommendation given for the adjacent Index. Small adjustments of less than 10 kg/ha are generally not justified.
Efficient use of P and K is most likely to be achieved on soils that are well structured and enable good rooting.
For visual evaluation of soil structure (VESS), a score on 1 or 2 would be considered adequate.
Don't forget to deduct nutrients applied as organic manures.
For Nitrogen recommendations please refer to the RB209 9th edition or seek advice from an FACTS qualified adviser.
Target Indices:
Arable, Forage, Grassland and Potato Crops: P Index 2, K Index 2-
(In rotations where most crops are Autumn-sown, soils are in good condition and P is applied annually, high index 1 can be an adequate target.)
Vegetables and Bulbs: P Index 3, K Index 2+
(If vegetables are only grown occasionally as part of an arable rotation, it would be most economic to target index 2 for arable and forage crops.)
Fruit Vines and Hops: P Index 2, K Index 2, Mg Index 2
(Note: Cider apples respond to K Index 3, Mg Index 3)
A lime recommendation is usually for a 20cm depth of cultivated soil or a 15cm depth of grassland soil. Where soil is acid below 20 cm and soils are ploughed for arable crops, a proportionately larger quantity of lime should be applied. However, if more than 10 t/ha is needed, half should be deeply cultivated into the soil and ploughed down, with the remainder applied to the surface and worked in.
For established grassland or other situations where there is no, or only minimal soil cultivation, no more than 7.5 t/ha of lime should be applied in one application.
In these situations, applications of lime change the pH below the surface very slowly. Consequently, the underlying soil should not be allowed to become too acidic because this will affect the root growth and thus limit nutrient and water uptake, which will adversely affect yield.

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 30 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395312 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 30 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395313 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 79 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395314 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 13 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395315 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 69 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395316 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**

Fertiliser recommendations are based on **AHDB RB209 (Ninth Edition).** If a nutrient is deficient and no recommendation is given, either no recommendation is given in RB209 or we have insufficient data to give a recommendation. Apply Lime to the nearest half Ton / Tonne.
NRM is a UKAS accredited laboratory to ISO/IEC 17025

Report continued.....

ANALYSIS REPORT

DATE	1st December 2023
SAMPLES FROM	BM12665BMEM, SURVEY ALC
SAMPLED BY	GRUFFYDD JONES CA11602
Report reference	75257/23

WARDELL ARMSTRONG LLP
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Fertiliser Recommendations

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 48 H2	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395317 / Heavy		*Kg/Ha*				*Te/Ha* **0**	**0**

Field Name / Ref / Soil Type	*Last Crop / Next Crop*		*P2O5*	*K2O*	*MgO*	*Lime (Arable)*	*(Grass)*
POINT 59 H1	**Not Given / Not Given**	*Units/Acre*				*T/Ac* **0**	**0**
395318 / Medium		*Kg/Ha*				*Te/Ha* **0**	**0**

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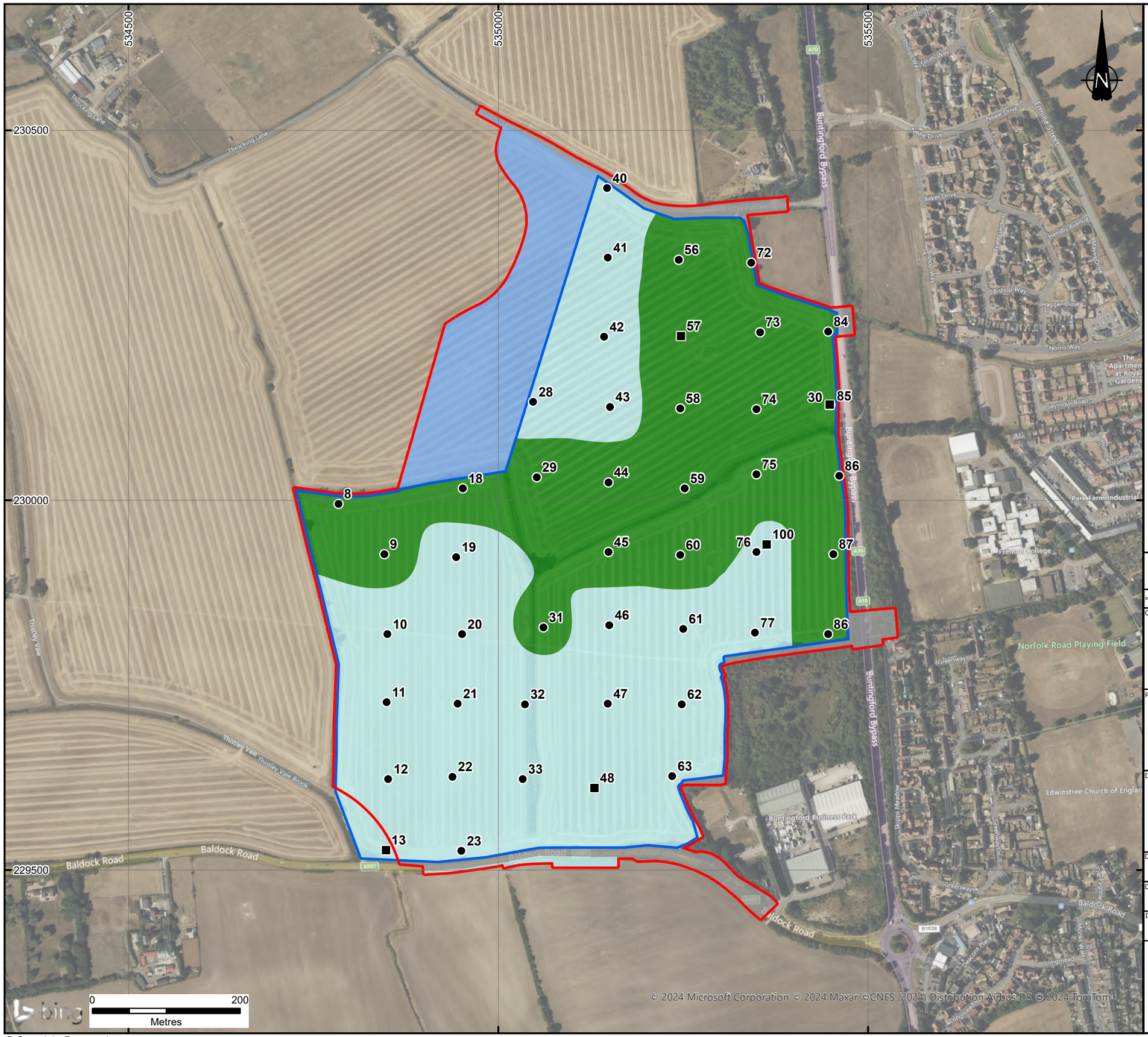
DRAWINGS



KEY

- Site Boundary
- Survey Boundary
- Auger Core
- Profile Pit

Agricultural Land Classification

- Grade 2
- Provisional Grade 2
- Subgrade 3a
- Non Agricultural

Site Boundary:

Grade	Area
Grade 2	24.42 ha
Provisional Grade 2	5.12 ha
Subgrade 3a	18.91 ha
Non Agricultural	1.68 ha

Survey Boundary:

Grade	Area
Grade 2	24.62 ha
Subgrade 3a	18.91 ha

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHK'D	APP'D
B	REVISED SITE BOUNDARY	05/24	GER		
A	FIRST ISSUE	03/24	SRW	GJ	BC

CLIENT

HALLAM LAND MANAGEMENT

PROJECT

BUNTINGFORD (EAST HERTFORDSHIRE) – NORTH

DRAWING TITLE

AGRICULTURAL LAND CLASSIFICATION

DRG No.	REV	SUIT. CODE
BM12665-001	B	--

DRG SIZE	SCALE	DATE
A3	1:5,000	15/05/2024

DRAWN BY	CHECKED BY	APPROVED BY
SRW	GJ	BC

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