



TERRA ANALYTICAL UK

Agricultural Land Classification Report

M Scott Properties Ltd

Land East of High Road, High Cross, Hertfordshire

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1. Summary

An Agricultural Land Classification Survey has been undertaken by Terra Analytical UK on behalf of M Scott Properties Ltd at a site to land East of High Road, High Cross, Hertfordshire.

The area of land assessed totalled 7.75 hectares in area.

The survey was carried out in October 2023 under a format that follows the 1988 MAFF guidelines for assessing Agricultural Land Classification and assessing limitations.

The agricultural land on the site has been classified as mainly heavy textured clay loam with poorly draining clay/silty clay subsoils.

Due to these properties coupled with climactic data, the soil wetness class limits the quality of the 7.75 hectares of agricultural land over the area to Agricultural **Grade 3b** (100%).

2. Background

Terra Analytical were instructed by M Scott Properties Ltd to determine the Agricultural Land Classification (ALC) of the land situated East of High Road, High Cross, Hertfordshire.

The site is centred on grid reference TL 3667 1877.

The site is a single parcel comprising an area of 7.75 ha- detailed in the site survey map in Appendix D. These fields are currently managed as part of an arable rotation and at present are fallow.

The land surveyed was bare agricultural land surrounded by various tree belts, hedgerows with no water bodies or wet ditches to be noted within the site.

Published information states the site's soils are predominantly belonging to the 'Hanslope 411d' soil series comprising slowly permeable calcareous clayey soils.

3. Methodology

Agricultural Land is classified into the following grades according to the 1988 guidelines (MAFF, 1988).

Table 1: Agricultural Land Grading categories

Grade	Description
1	Excellent quality Agricultural Land with no or very minor limitations to Agricultural use
2	Very good quality Agricultural Land with minor limitations which effect crop yield, cultivation or harvesting
3a	Good quality Agricultural Land capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops
3b	Moderate quality Agricultural Land capable of producing moderate yields of a narrow range of crops and/or level of yields
4	Poor quality Agricultural Land with severe limitations which significantly restrict the range of crops and/or level or yields.
5	Very poor-quality Agricultural Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and parent soil geology. At this point climate data is obtained from the Met Office publication; Climatological Data for Agricultural Land Classification (1989) and was used to determine overriding site limitation and interaction with soil parameters.

This is then followed up by a field site survey to gain the physical data in relation to the survey.

The site visit took place on Friday 27th October 2023 where a total of 9 soil auger borings were extracted to a depth of 120cm (where possible) and 1 soil examination pits to make a detailed assessment of the soil profile and sub-soil structure. Soil auger boring and soil pit locations were carried out on a 100m x 100m grid at a density of one per hectare to ensure an unbiased and logical gathering of data. A copy of the location of augers borings are shown in Appendix D.

Soil texture was assessed by the consultant carrying out the survey, however, samples were sent for independent laboratory analysis to support the assessment. The results of this analysis are fully detailed in Appendix B.

3.1 Previous ALC Gradings

The 1:250000 Natural England 2010 ALC map details the entire site as ALC Grade 2/3 (no sub-grade defined) as per Appendix C.

4. Land Classification

The ALC assessment is undertaken in accordance with the Agricultural Land Classification for England and Wales; Revised Guidelines for Grading the Quality of Agricultural Land 1988 and the final grade is ultimately determined by the **most limiting factor** present.

The main limiting factors used in the ALC system, which determines the split into one of the 6 classification grades are:

- Climatic Limitations
- Site Limitations
- Soil Limitations
- Interactive Limitation

4.1) Climatic Conditions

The climatological data for the site has been interpolated from Meteorological Office (1989) data and is shown below in Table 2. The full workings are detailed in Appendix A. It shows the interpolated adjustment for altitude, average annual rainfall, accumulated temperature, field capacity days and the moisture deficit for Wheat and Potatoes for the site at Warlingham.

Table 2 – Climatological Data

Table 2 – Climatological Data for Land off High Road, High Cross, Hertfordshire TL 3667 1877		
Climatological Factor	Units	Value
Altitude	m	90
Average Annual Rainfall (AAR)	mm	611
Accumulated Temperature (AT0)	Day ° C (Jan – Jun)	1328
Field Capacity Days	Day	118
Moisture Deficit – Wheat	mm	112
Moisture Deficit - Potatoes	mm	105

Based on the Average Annual Rainfall and Accumulated Temperature, the grade according to climate at this site should be no less than **ALC Grade 1**.

4.2) Site Limitations

The assessment of the site factors is primarily concerned with the way in which the topography influences the use of Agricultural machinery and hence the potential cropping of the land.

4.2.1 Gradient

This can influence the ALC of a site due to it affecting the type of machinery which can be safely and efficiently operated. Grades 1 to 3a have a gradient limit of seven degrees. Grade 3b has a limit of 11 degrees.

The gradient of the land at High Cross is relatively consistent and at no point exceeds seven degrees. Therefore, based on gradient, this site should be classified no less than **ALC Grade 1**.

Image 1- Topography and Micro-relief of Land East of High Road, High Cross, Hertfordshire



4.2.2 Micro-relief

Complex changes to slope angle and direction over short distances, or the presence of boulders or rock considerably limits the use of agricultural machinery. The micro-relief across the land at High Cross is not considered a limiting factor in assessing the ALC of this site (Image 1).

4.2.3 Flooding

A low risk from flooding for surface water and very low risk to rivers and sea has been identified.

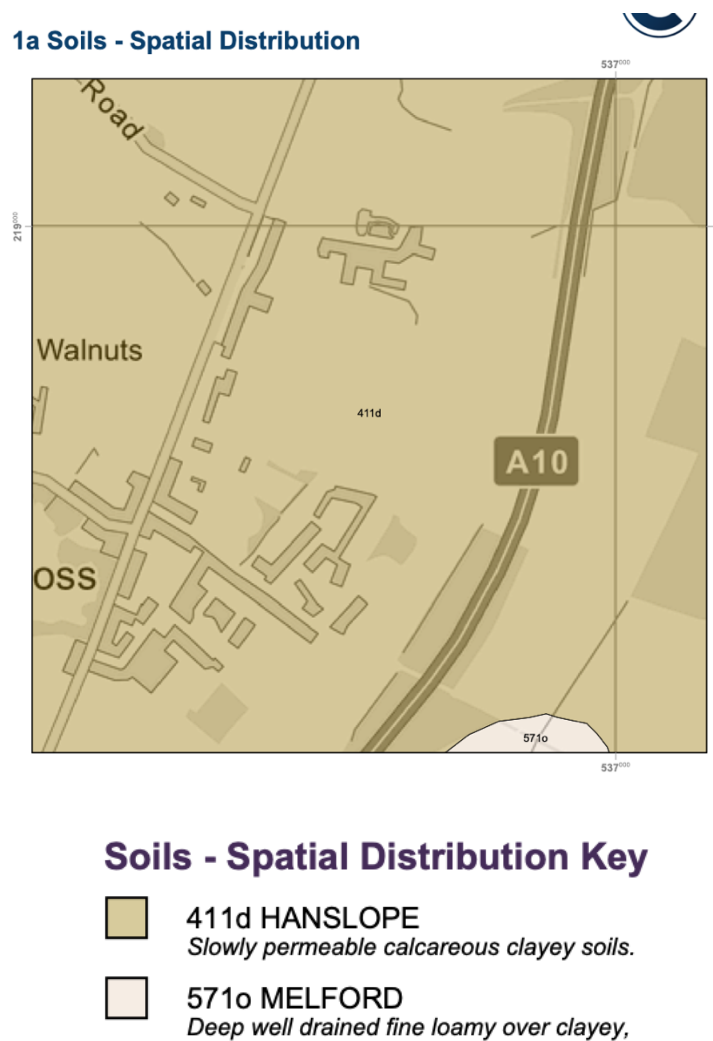
<https://check-long-term-flood-risk.service.gov.uk/postcode>

The risk of flooding will therefore not result in a significant limiting factor for this site.

4.3 Soil Limitations

The soils previously mapped on site are the 'Hanslope 411d' association mapped over the entire site. See figure 1 below.

Figure 1- Spatial distribution of soils at the site.



A detailed soil quality assessment was made over the site. A 100m x 100m grid was made over the site (as detailed in Appendix E). 9 auger borings to a depth of 120cm (where possible) were taken and 1 soil pit was dug to a depth of 120cm to observe details around soil quality and composition.

The soils were relatively consistent at the site.

4.3.1 Heavy Clay Loam Topsoil over Clay Subsoil

A typical observation profile can be seen below:

Boring B6- Appendix B & E

0-35cm Grey/Brown (5YR 5/2) clay loam; stoney; moderately developed coarse sub-angular blocky structure; soft; non-calcareous; smooth clear boundary to:

35-60cm Grey/Brown (5YR 5/4) clay; slightly stoney; weakly developed coarse angular block structure; soft; smooth gradual boundary to:

60-120cm+ Yellow/Brown (5YR 6/6) with common duller brown; stoneless; weakly developed coarse angular blocky prismatic structure; firm. Poorly structured.

These are typically poorly draining soils and of soil wetness class III with a moderate capacity to absorb excess winter rainfall.

4.3.2 Soil Depth

The depth of soil can be a limiting factor within ALC. The land at High Cross, Hertfordshire had soil depths in excess of 60cm across the whole site and therefore can be graded no less than **ALC Grade 1**.

4.3.3 Stoniness

Another limiting factor is stoniness, which assesses the percentage (volume) of hard stones in the top 25cm of soil. High percentages of stones in these areas of the profile can impact crop growth, cultivations and harvesting. The stone content of the Land at High Cross, Hertfordshire was not a limiting factor.

4.3.4 Chemical Limitations

Sites can be limited according to chemical contamination and whether their ability to be farmed can be maintained by routine applications of fertiliser and lime. From the laboratory results it is noted that chemical contamination or a nutrient imbalance is not present at the site and therefore is not a limiting factor.



4.4 Interactive Limitations

Interactive limitations are the physical limitations which result from interactions between climate, site and soil (MAFF, 1988). Within this, soil wetness, droughtiness, irrigation and soil erosion are assessed.

4.4.1 Soil Wetness

The soil wetness of the site is deemed to be Wetness Class III. Therefore, the ALC grade based on wetness class, considering the site has topsoil textures of heavy clay loam and field capacity days of 118 (Table 1 & Appendix A), should be no less than **ALC Grade 3b** (7.75 ha). This is deemed the most limiting factor for the site.

4.4.2 Soil Droughtiness

Soil droughtiness needs to be assessed as available and adequate moisture is vital to a crop achieving full yield potential. Two crops, a shallow and deep rooting crop are used to provide an average drought risk assessment of the soil. Stoniness of the soil, soil type and soil structure are all used to determine the moisture balance (crop adjusted available water capacity *less* moisture deficit). Droughtiness calculations have found the moisture balance is considered a limitation in down grading the site detailed in Appendix A. This factor contributes to all the downgrading of the site to **ALC Grade 2**.

4.4.3 Soil Erosion

Soil erosion is a factor to consider when grading Agricultural Land. Given the presence of coarse sandy loam topsoils, which are not susceptible to wind blow and the sheltering effect of many of the hedgerows and woodland; soil erosion is not considered significant enough to downgrade the site.

5. Final Classification

Prior to carrying out this report, the land East of High Road, High Cross, Hertfordshire was classified by Natural England in their 2010 Agricultural Land Classification Maps (Data from pre-1988) as sat as Grade 2/3 Agricultural Land (as shown in Appendix C).

5.1 Final Grading and most Limiting Factor

Grade 3b- Wetness Limitation

The combination of the topsoil texture (Heavy Clay Loam), Wetness Class III and the number of Field Capacity Days of 118, results in **ALC Grade 3b** for agricultural area within the site (7.75ha).

5.2 Current Grading

Drawing on the climatological data, site limitations, soil limitations and interactive limitations investigated in the report thus far, the 7.75 ha site off High Road, High Cross, Hertfordshire should receive the following Agricultural Land Classification:

Table 3 – Final Agricultural Grading split of ‘Land East of High Road, High Cross TL 3667 1877’

ALC Gradings and Limitations			
Grade	Hectares	Percentage (%)	Limitation
1	-	-	-
2	-	-	-
3a	-	-	-
3b	7.75	100%	Wetness
4	-	-	-
5	-	-	-
Non-Agricultural Land	-	-	-
Total	7.75	100%	-

5.2.1 Results Discussion

Grade 3b

There are 7.75 hectares of Grade 3b soils on the site. This is predominantly made up of heavy clay loam topsoils and clay subsoils. These subsoils are poorly structured, poorly draining and hold a Wetness Class of III (ALC Grade 3b) and are of the majority on the site.

Workability of these soils is likely to be limited to the autumn with a mainly cereal crop rotation. The relatively dry climate does lend itself to extended agricultural use in the Autumn potentially depending on Autumn rainfall. These types of soils are not suited to row crops or high value vegetable crops such as potatoes but do have the potential to produce moderate cereal yields.

The final ALC grade map can be found in Appendix E.

5.3 Further Remarks

Should the site be developed, these types of soils are very prone to compaction- resulting in the soil being even less permeable. Therefore, care would be advised in the use of heavy machinery. If heavy machinery is used, thought should be taken to loosen subsoil compaction before the spreading for topsoil.

Care should also be taken in soil selection for landscape use. The topsoil, however, would be of reasonable quality and should be stored in separate bunds (recommended to be no higher than 3 metres). In order to protect them as a topsoil resource, they should be kept free of vegetation and compaction.

Ideal times for workability for these types of soils should be between April and September and care should be taken in working these soils, during and after heavy rainfall.

Agricultural Land Classification

Statement of Competence

Terra Analytical UK Ltd and the agents acting on behalf of the company, conduct numerous Agricultural Land Classification Surveys (ALC), Land Appraisal Studies and Agricultural Impact Assessments.

These surveys are carried out for a variety of clients in the rural sector. More commonly, instructions are received from developers in the residential, commercial, mineral and renewable spheres.

Our agents have attended and fulfilled the criteria from the Agricultural Land Classification Course: Working with Soils- run by the British Association of Soil Scientists resulting in an advanced level of competence when carrying out these surveys.

Piers Bulgin BSc (Hons) holds a second class, upper division honours degree from Harper Adams University, Shropshire. He graduated in 2008, involved in the management of two 1000 ha Agricultural businesses from 2009-2021.

He specialises in land use management and advises private clients on the profitable and sustainable operational practice of their land.

He farms in his own right on an 800-acre grassland farm in mid-Norfolk and South Essex, over a range of different soil types.

He is qualified through the British Association of Soil Scientists to carry out Agricultural Land Classification Surveys and has acted for several high-profile clients in these matters. His academic credentials and experience in the industry within this particular field, makes him more than suitably qualified to prepare this report.

Information Sources-

Ministry of Agriculture, Fisheries and Food, 1988, Agricultural Land Classification of England and Wales

Meteorological Office, 1989, Climatological Data for Agricultural Land Classification

Munsell Colour Chart

Cranfield University, LandIS, 2022, Soil Site Soil Reporter

Flood Warning Information Service- Online, 2022 <https://check-long-term-flood-risk.service.gov.uk/postcode>

Appendix A - Auger Boring and Soil Pit Information including Wetness Assessment

Boring / Pit (feet)	Horizon	Base depth (cm)	Horizon Thickness for Droughtiness Calculations	Texture	Calcium	Colour	Moist. %/depth	Stones %	Stones Type	Porosity <5mm%	Structure	Spn depth (cm)	GIWng depth (cm)	SWCSoil wetness class	Grade (wetness)	Top total available moisture)	Low total available moisture)	35% RSW available	50% RSW available	Total for Wheat	Total for potatoes	MBW	Grade (Drought WHEAT)	MBP	Grade (Drought POTATOES)	
B1	1	38	38	0	38 CL	n/a	5.00	0.00	All hard rocks or stor	n/a	moderate	38	38	III	3b	18	16	8	0	0	134.37	113.37	22.37	2	8.37	2
	2	60	12	10	22 C	5YR 5/4	xxx	0.00	-	n/a	moderate					13	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B2	1	32	32	0	32 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	32	32	III	3b	18	16	8	0	0	136.4	115.4	24.4	2	10.4	1/2
	2	60	18	10	28 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B3	1	35	35	0	35 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	35	35	III	3b	18	16	8	0	0	137	116	25	2	11	1
	2	60	15	10	25 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B4	1	36	36	0	36 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	36	36	III	3b	18	16	8	0	0	137.2	116.2	25.2	2	11.2	1
	2	60	14	10	24 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B5	1	32	32	0	32 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	32	32	III	3b	18	16	8	0	0	137.2	116.2	25.2	2	11.2	1
	2	60	18	10	28 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B6 & B7.1	1	35	35	0	35 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	35	35	III	3b	18	16	8	0	0	136.4	114.4	24.4	2	9.4	1/2
	2	60	10	10	20 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B7	1	35	35	0	35 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	35	35	III	3b	18	16	8	0	0	137	116	25	2	11	1
	2	60	15	10	25 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B8	1	34	34	0	34 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	34	34	III	3b	18	16	8	0	0	137	116	25	2	11	1
	2	60	16	10	26 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						
B9	1	34	34	0	34 CL	n/a	5YR 5/2	0.00	All hard rocks or stor	n/a	moderate	34	34	III	3b	18	16	8	0	0	136.8	115.8	24.8	2	10.8	1
	2	60	16	10	26 C	5YR 5/4	xxx	0.00	-	n/a	moderate					16	16	8	0	0						
	3	120	0	60	10 C	5YR 6/6	xxx	0.00	-	n/a	poor					7	7	7	0	0						

Key to table
 Moderate density
 0 - low to common (1st root nodules (top soil) SCL - Sandy Clay
 x - few to common (1st root nodules (top soil) SCL - Sandy Clay
 (for a few or more nodules (top soil) SCL - Sandy Clay
 xx - common to many ochreous nodules and SCL - Sandy Clay loam
 xxx - common to many greyish or pale nodules SCL - Sandy Silt loam
 xxxx - dominantly grey, often with some ochreous - Sandy loam
 L - Loamy Sand
 U - Topography/Microfield
 A depth underlines (e.g. 2.5) indicates Sand
 (a dashed underline indicates the P - Peat
 P - Loamy Peat
 K - Bedrock

Soil Profile Data - Site
 All laboratories are identified and derived from the guidelines documentation:
 Agricultural Land Classification of England & Wales - Key soil grades and criteria for grading the quality of agricultural land, MAF, 1988
 Soil Survey Field Handbook, Technical Monograph No. 5, Soil Survey of England and Wales, 1979
 Murchie Colour Chart

Limitations
 N - Wetness/availability
 D - Depth
 SI - Slope
 F - Flooding
 T - Topography/Microfield
 Ca - Calcium
 Mn - Manganese presence
 K - Bedrock

ANALYTICAL REPORT

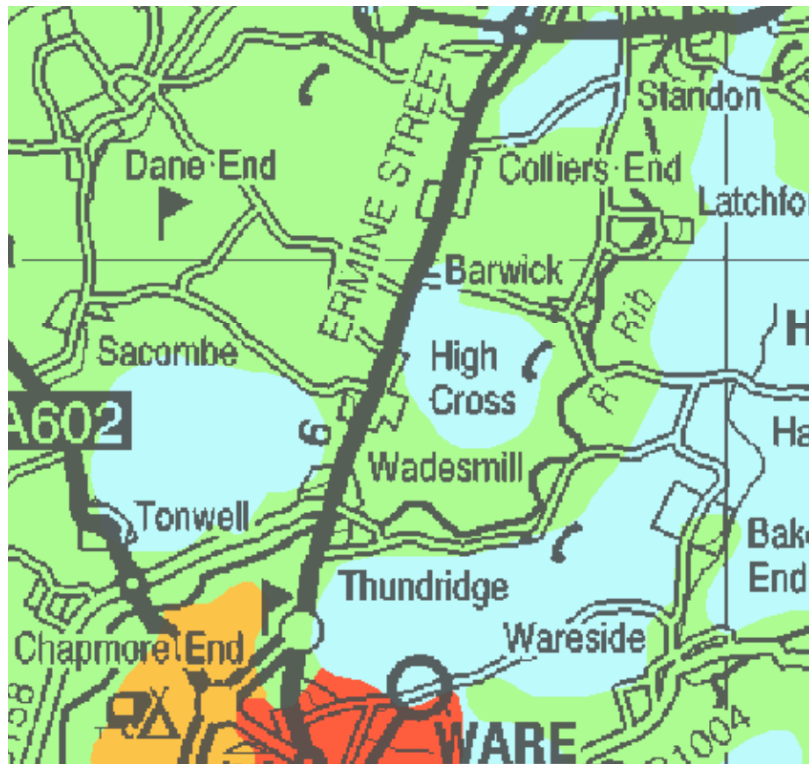
Report Number	99304-23	B 86	PIERS BULGIN
Date Received	03-NOV-2023		TERRA ANALYTICAL UK LTD
Date Reported	15-NOV-2023		POPPS COTTAGE
Project	SOIL		LITTLE THEY ROAD
Reference	PIERS BULGIN		FEERING
Order Number			ESSEX CO5 9RP

Laboratory Reference	SOIL 663058	SOIL 663059	SOIL 663060	SOIL 663061					
Sample Reference	HIGH CROSS TOPS 1	HIGH CROSS SUBS 1	HIGH CROSS TOPS 2	HIGH CROSS SUBS 2					
Determinand	SOIL	SOIL	SOIL	SOIL					
Textural Class	Clay Loam	Silty Clay	Clay Loam	Silty Clay Loam					
Sand 2.00-0.063mm	% w/w 23	% w/w 16	% w/w 26	% w/w 19					
Silt 0.063-0.002mm	% w/w 46	% w/w 48	% w/w 45	% w/w 48					
Clay <0.002mm	% w/w 31	% w/w 36	% w/w 29	% w/w 33					

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.
This test report shall not be reproduced, except in full, without the written approval of the laboratory.

Reported by
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Appendix C- 2010 Natural England ALC Map of Land East of High Road, High Cross, Hertfordshire



<i>Grade</i>	<i>Description</i>
1	Excellent
2	Very Good
3	Good to Moderate
4	Poor
5	Very Poor
<i>Non-Agricultural Land</i>	
	Other land primarily in non-agricultural use
	Land predominantly in urban use

Appendix D- Site Map Plan with Auger Borings and Soil Pit Locations



M Scott Properties Ltd- High
Cross, Hertfordshire- Site Survey
Map



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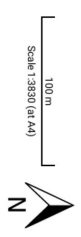
Appendix E- Final ALC Survey Grading Map



M Scott Properties Ltd- High Cross,
Hertfordshire- Final ALC Grading Map



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Soil Site Report

Soil Report



TA- Scott Properties- High Cross, Hertfordshire

Easting: 536635

Northing: 218719

Site Area: 1km x 1km

Prepared for: Piers Bulgin, PERSONAL USE

Date: 16 Nov 2023

