



Garth Wymott 2

Agricultural Land Classification

September 2021

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK ADAS Ltd.

EXECUTIVE SUMMARY

ADAS have been instructed by Mace Group to undertake an agricultural land classification survey of 44.2 ha of land beside HMP Garth and HMP Wymott, near Leyland, Lancashire.

The survey has identified imperfectly draining fine and coarse loamy soils, poorly draining fine loamy over clayey soils and soils formed in overburden. These soils form agricultural land of subgrade 3a (2.8 ha, 6%), subgrade 3b (3.0 ha, 7%), grade 4 (11.8 ha, 27%) and grade 5 (6.7 ha, 15%) quality. The principal limitations to agriculture are soil wetness, land access restrictions and microrelief. The site also has 20.1 ha (45%) of non-agricultural land.

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1 INTRODUCTION

ADAS have been instructed by Mace Group to undertake an agricultural land classification survey. This report provides information on the soils and agricultural quality of 44.2 ha of land beside HMP Garth and HMP Wymott near Leyland, Lancashire. The report is based on a survey of the land undertaken in August 2021.

1.1 Site Environment

The survey area covers 44.2 ha beside HMP Garth & HMP Wymott. The survey area is a mixture of non-agricultural and agricultural land. The non-agricultural areas include roads, paths, fencing, car parks, woodland, amenity land, agricultural outbuildings and buildings associated with HMP Garth & HMP Wymott. The agricultural areas are grassland with grazing by cattle, horses and sheep. In places grazing occurs right up to the outer fences of the prisons. There are also significant areas of disturbed land, with soil bunds found immediately beside the prisons. These areas of overburden are moderately sloping (4-6°) in places, whilst the remainder of the survey area is level (0-1°) to gently sloping (2-3°). The land has an average elevation of approximately 14m AOD.

1.2 Agricultural Use

At the time of survey the agricultural land of the survey area was beneath grass, grazed by sheep, cattle and horses.

1.3 Published Information

1.3.1 Geology

1:50,000 scale BGS information¹ records the basal geology of the site as mudstone formed 242-252 million years ago in the Triassic Period. Over the majority of the site overlying surface deposits are recorded as diamicton (glacial till), comprised of poorly sorted glacial deposits containing a wide range of particle sizes from clay to boulders suspended in a matrix of mud or sand. Running in a band, north to south, towards the east of the site head deposits are recorded, comprised of clay, silt, sand and gravel.

1.3.2 Soils

The national soils map, published at 1:250,000 scale, records the site as belonging to the Salop soil association. This is described as an association of slowly permeable, seasonally waterlogged reddish fine loamy over clayey, fine loamy and clayey soils formed in reddish glacial till. Plus some similar soils with slowly permeable subsoil at greater depth which suffer only slight seasonal waterlogging².

¹ British Geological Survey, 2021. *Geology of Britain viewer*. Online resource:

<http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>

² Jarvis R.A. et al.; 1984. *Soils and their use in Northern England*. Soil Survey of England and Wales; Harpenden.

1.3.3 Previous Agricultural Land Classification

No detailed post-1988 agricultural land classification is publicly available for this site. The provisional ALC map, published at 1:250,000 scale, records the land as being of grade 3 quality³.

³ Defra, 2021. *Interactive map of Great Britain*. Online resource: <https://magic.defra.gov.uk/MagicMap.aspx>

2 METHODOLOGY

A detailed soil survey was carried out in August 2021. The survey was based on observations at intersects of a 100 m grid, giving a sampling density of one observation per hectare on the agricultural land present on the site. During the survey soils were examined via a combination of auger borings and soil pits to a maximum depth of 1.2 m. A log of the details of each observation point is attached to this report as Appendix 4. A map showing the location of each observation point is attached to this report as Appendix 1, Map 1.

Three soil pits were dug at this site. Eight topsoil samples were submitted to NRM laboratories for particle size distribution analysis by the pipette methodology. The results of this analysis are given in Section 3 and in Appendix 5.

3 SOILS

3.1 Soil Types

There are four principal soil types at this site: fine loamy over clayey soils formed in reddish till; fine loamy over clayey soils formed in alluvium; fine loamy and coarse loamy soils; and variable soils formed in overburden. The distribution of these soil types is given in Map 2, Appendix 2. These soils are described in greater detail below.

3.1.1 Fine loamy over clayey soils formed in reddish till

These soils generally have heavy clay loam or clayey topsoil. In the north-east, bordering the fine loamy and coarse loamy soils described in section 3.1.3, these soils have medium-textured fine loamy topsoil. The upper subsoil is fine loamy or clayey and the lower subsoil is reddish clayey. The subsoil is gleyed⁴ within 40 cm depth and poorly structured and slowly permeable within 58 cm depth. Upper horizons are very slightly stony (0-5%) and the reddish lower subsoil is stoneless.

An example soil profile is described below from the pit at observation 30 (see Map 1).

0-10 cm	Very dark greyish brown (10YR 3/2) heavy clay loam; very slightly stony (c. 3%), with a few medium subangular and subrounded hard stones; weakly developed fine to medium subangular blocky structure; firm; many fine fibrous roots; abrupt smooth boundary to:
10-27 cm	Very dark grey (10YR 3/1) heavy clay loam with common medium strong brown (7.5YR 4/6) mottles; very slightly stony (c. 3%), with a few subangular and subrounded hard stones; weakly developed very coarse subangular blocky structure; very firm; many fine fibrous roots; clear smooth boundary to:
27-40 cm	Pale brown (10YR 6/3) and light brownish grey (10YR 6/2) clay with many medium strong brown (7.5YR 5/8) mottles; stoneless; weakly developed coarse prismatic structure; very firm; <0.5% macropores; gradual wavy boundary to:
40-80+ cm	Reddish grey (5YR 5/2) clay with dark grey (5YR 4/1) peds and common fine strong brown (7.5YR 5/8) and blueish grey (5PB 5/1) mottles; stoneless; weakly developed very coarse prismatic structure; very firm; <0.5% macropores.

These soils are poorly-draining and belong to Wetness Class IV. They have a low capacity to absorb excess winter rainfall.

3.1.2 Fine loamy over clayey soils formed in alluvium

These soils have medium or heavy textured organic rich fine loamy topsoil overlying gleyed, poorly structured and slowly permeable clayey subsoil within 40 cm depth. The topsoil is very slightly stony (0-5%) or stoneless and the greyish lower subsoil is stoneless.

An example soil profile is described below from the pit at observation 24 (see Map 1).

0-38 cm	Black (10YR 2/1) organic medium clay loam; very slightly stony (c. 3%), with a few small and medium subrounded and subangular hard stones; friable; common fine fibrous roots; non-calcareous; clear smooth boundary to:
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⁴ Gleying is a soil colouring indicative of periodic or permanent waterlogging.

- 38-90+ cm Grey (10YR 5/1) clay with common medium yellowish brown (10yr 5/6) mottles; stoneless; weakly developed very coarse prismatic structure; very firm; no roots; <0.5% macropores; non-calcareous.

These soils are poorly-draining and belong to Wetness Class IV. They have a low capacity to absorb excess winter rainfall.

3.1.3 Fine loamy and coarse loamy soils

These soils have medium-textured organic rich fine loamy topsoil overlying gleyed subsoil within 40 cm depth. The subsoil is comprised of permeable fine loams or coarse loams to at least 70 cm depth. Below 70 cm depth poorly structured slowly permeable reddish clayey lower subsoil may be found. Stone content tends to increase with depth, until reaching the stoneless reddish clay, with common (5-15%) to many (15-20%) very small, small and medium subrounded hard stones.

An example soil profile is described below from the pit at observation 3 (see Map 1).

- 0-33 cm Black (10YR 2/1) organic medium clay loam; stoneless; 0-10 cm strongly developed fine subangular blocky structure, 10-33 cm moderately developed coarse subangular blocky structure; firm; many fine fibrous roots; clear smooth boundary to:
- 33-50 cm Grey (7.5YR 6/1) and light grey (10YR 6/2) medium sandy loam with common fine yellowish brown (10YR 5/6) mottles; slightly stony (10%), with common very small, small and medium subrounded hard stones; weakly developed medium subangular blocky structure; friable; clear irregular boundary to:
- 50-75 cm Grey (5YR 5/1) and reddish grey (5YR 5/2) coarse sandy loam with many fine yellowish red (5YR 5/8) mottles; moderately stony (15-20%), with many very small, small and medium subrounded hard stones; weakly developed adherent coarse subangular blocky structure; firm; c. 0.5% macropores; clear smooth boundary to:
- 75-90 cm Dark reddish brown (5YR 3/2) clay with many medium strong brown (7.5YR 5/8) mottles; stoneless; massive structure; firm; <0.5% macropores.

These soils are imperfectly-draining and belong to Wetness Class III. They have a moderate capacity to absorb excess winter rainfall.

3.1.4 Overburden soils

These soils are found on soils bunds and flatter ground immediately bordering HMP Garth and HMP Wymott. The land is manmade or heavily disturbed. These soils account for a substantial proportion of the site. They contain a variable mix of clay loams, clay, naturally occurring stone and manmade debris. In places stone or debris exceeds 20% within shallow depth. It is difficult to characterise or typify the soils as they vary significantly over short distances.

There are disturbed soil profiles across the wider survey area but it is thought that these relate to previous occupation of the land by the Ministry of Defence rather than the prisons which were built later in the 20th century. These profiles do not occur consistently enough to be mapped separately.

3.2 Laboratory Analysis

Samples representative of the top 25 cm of the soil profile were taken from eight observation points. These soils were submitted to NRM Laboratories for particle size

distribution (PSD) analysis by the pipette methodology. The textures are confirmed in the table below.

Table 3.2: PSD analysis results

Observation	PSD Analysis
3	Sandy clay loam
5	Clay
11	Heavy clay loam
15	Heavy clay loam
19	Clay
23	Heavy clay loam
24	Sandy clay loam
30	Heavy clay loam

4 AGRICULTURAL LAND CLASSIFICATION

The Agricultural Land Classification (ALC) system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use for food production. The limitations can operate in one or more of four principal ways; they may affect the range of crops which can be grown, the level of crop yield, the consistency of crop yield, and the cost of obtaining a crop.

The classification system gives considerable weight to flexibility of cropping, whether actual or potential, however the ability of some land to produce consistently high yields of a narrower range of crops is also taken into account.

The Agricultural Land Classification (ALC) system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced by the then Ministry of Agriculture, Fisheries and Food (MAFF) in the 1960s and revised in 1988. A description of the grades used in the ALC system is attached to this report as Appendix 6.

4.1 Climate

The agricultural climate is an important factor in assessing the agricultural quality of land, and the agricultural climate of this site has been calculated using the Climatological Data for Agricultural Land Classification⁵. The relevant site data for an average elevation of 14 m AOD is given below.

Table 4.1: Agro-climatic variables

Average Annual Rainfall (AAR)	932 mm
January-June Accumulated Temperature (AT0)	1427 day °C
Field Capacity Days (FCD)	216
Field Capacity Period	early Oct - early May
Moisture Deficit Wheat (MDW)	79 mm
Moisture Deficit Potatoes (MWP)	65 mm
Climate (upper grade limit)	1

The site is located in lowland England and there is no agro-climatic limitation to agriculture.

4.2 Results

The results of the soil survey described in section 3 were used in conjunction with the agro-climatic data above to classify the land according to the revised guidelines for Agricultural

⁵ Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

Land Classification issued in 1988 by the Ministry of Agriculture, Fisheries and Food (now Defra)⁶.

This report has identified agricultural land of subgrade 3a, subgrade 3b and grade 4 quality. The principal limitation to agricultural use of the land is soil wetness, with land access and microrelief the principal limitations on the land closest to the prisons.

Grade 1

No land of this quality has been mapped.

Grade 2

No land of this quality has been mapped.

Subgrade 3a

There 2.6 ha of subgrade 3a land at this site. This land is formed on fine and coarse loamy soils such as those described in section 3.1.3. These soils are gleyed within 40 cm depth but permeable to at least 70 cm depth. They are imperfectly draining and belong to Wetness Class III. They have medium-textured topsoil.

On such land the principal limitation to agriculture is soil wetness. This is a moderate limitation to agriculture. This is good quality agricultural land which is able to support moderate to high average yields of a narrow range of arable crops, especially cereals, or moderate average yields of a wider range of crops, including grass, oilseeds, potatoes and sugar beet.

Subgrade 3b

There are 3.0 ha of subgrade 3b land at this site. This land is formed on fine loamy over greyish clayey soils such as those described in section 3.1.2. These soils are gleyed and slowly permeable at shallow depth. They are poorly draining and belong to Wetness Class IV. They have medium-textured topsoil.

On such land the principal limitation to agriculture is soil wetness. This is a moderate limitation to agriculture. This is moderate quality agricultural land which is able to support moderate average yields of a narrow range of crops, principally cereals and grass, or lower average yields of a wider range of crops.

Grade 4

There are 11.8 ha of grade 4 land at this site. This land is formed on fine loamy over clayey soils, such as those described in sections 3.1.1 and 3.1.2. These soils are gleyed and slowly permeable at shallow depth. They are poorly draining and belong to Wetness Class IV. They have heavy-textured topsoil (heavy clay loam or clay).

On such land the principal limitation to agriculture is soil wetness. This is a severe limitation to agriculture. This is poor quality agricultural land which is mainly suited to grass with occasional break crops.

⁶ MAFF, (1988). *Agricultural Land Classification for England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Grade 5

There are 6.7 ha of grade 5 land at this site. This land is formed on overburden soils found immediately beside the prisons, such as those described in section 3.1.4. The principal limitation to agriculture is the land access restrictions caused by the close proximity to the prisons and their surrounding infrastructure. It is unrealistic that this land would be easily or regularly accessed by larger farm machinery. Microrelief is also a restriction on steeper sided bunds and there are concerns of contamination and soil toxicity.

This is very poor quality agricultural land with very severe limitations. It is best suited to permanent pasture or rough grazing, perhaps with one cut of grass, utilised or not, per summer in some slightly less restricted sections.

Non-agricultural

There are 20.1 ha of non-agricultural land at this site. This land accounts for an area of HMP Wymott in the east of the site plus roads, car parks, outbuildings, paths, fencing, amenity land, woodland and ponds.

Urban

No land of this quality has been mapped.

4.3 Summary of grade areas

The boundaries between the different grades of land are shown on Appendix 3, Map 3. The area occupied by each grade is shown below.

Table 4.3: Grade areas

Grade / subgrade	Area (ha)	Area (%)
Grade 1	-	-
Grade 2	-	-
Subgrade 3a	2.6	6
Subgrade 3b	3.0	7
Grade 4	11.8	27
Grade 5	6.7	15
Non-agricultural	20.1	45
Urban	-	-
Total	44.2	100

5 APPENDICES

Appendix 1 – Map 1: Location of Observations

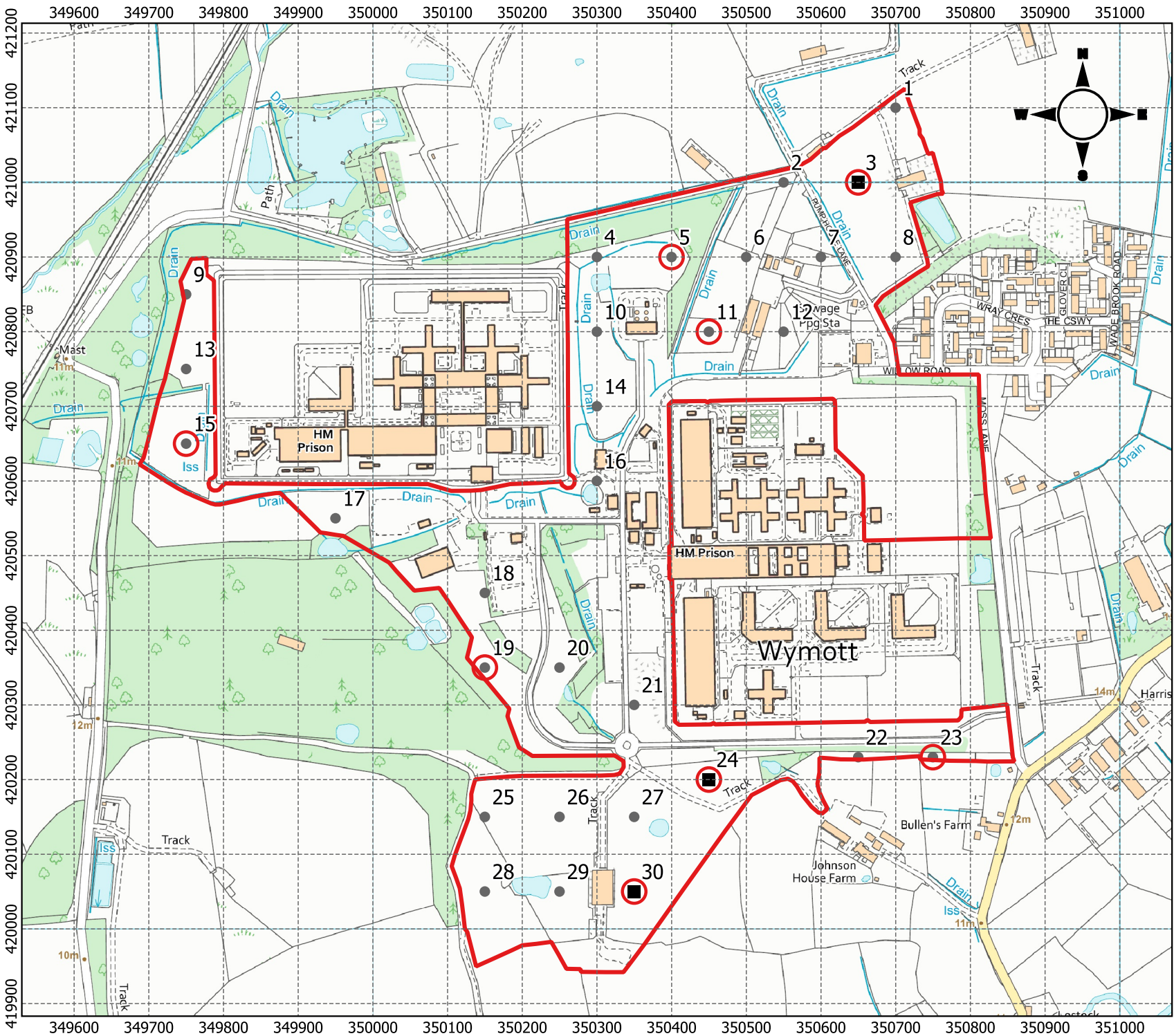
Appendix 2 – Map 2: Soil Types

Appendix 3 – Map 3: Agricultural Land Classification

Appendix 4 – ALC Survey Details


Appendix 5 – PSD Analysis

Appendix 6 – Description of ALC Grades







Title
 Appendix 1: Map 1
 Location of Observations

Project
 Garth Wymott 2

Client


Key

-  Survey area
-  Soil auger
-  Soil pit
-  Soil sample

Date: 07 / 09 / 2021

Scale: 1 : 7,000 at A4



350000

351000

421000

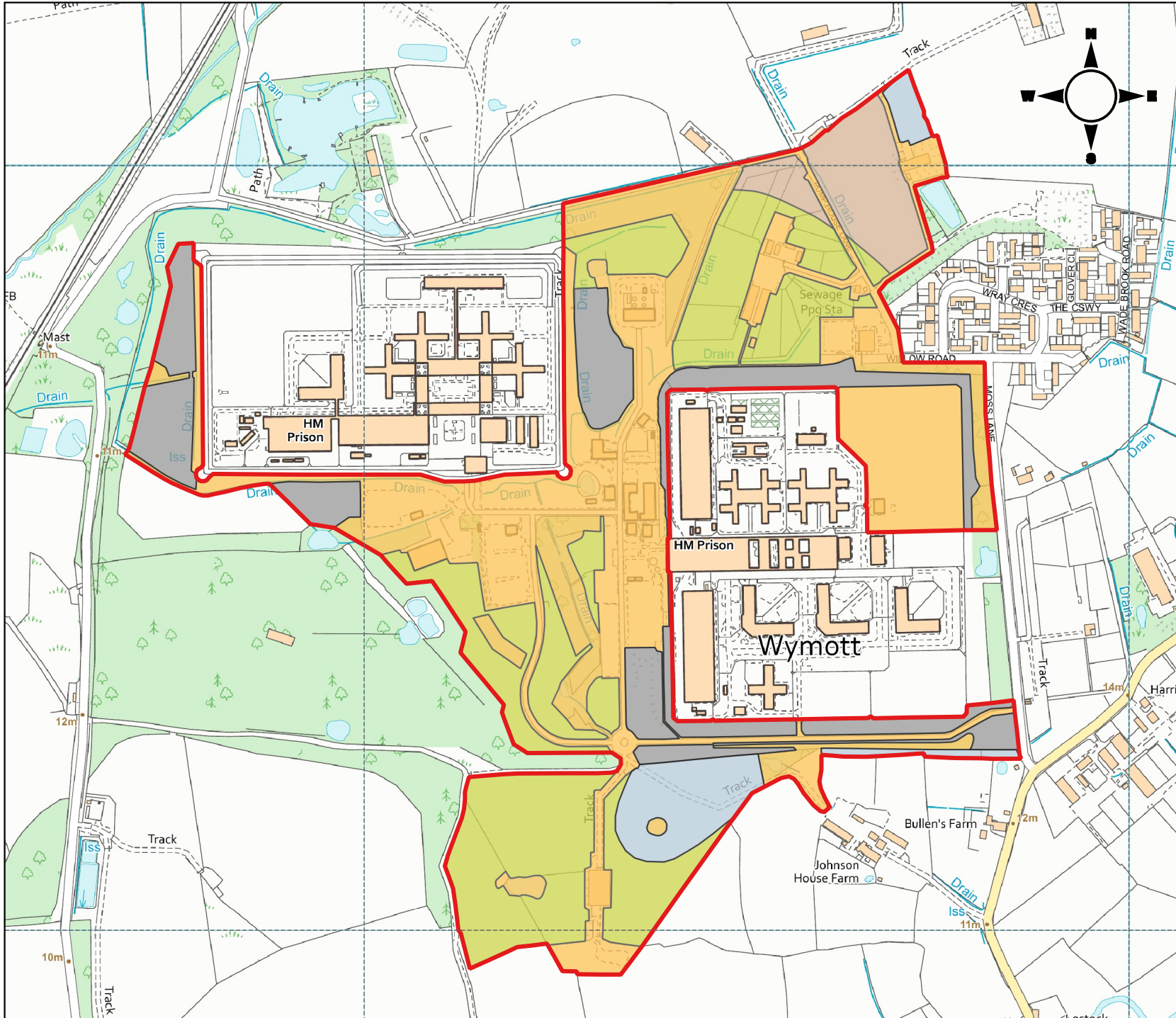
421000

420000

420000


350000







351000



Title
Appendix 2: Map 2
Soil Types

Project
Garth Wymott 2

Client


- Key**
-  Survey area
 -  Non-agricultural land
 -  Fine loamy / clayey (reddish till)
 -  Fine loamy / clayey (alluvium)
 -  Fine and coarse loamy
 -  Overburden

Date: 07 / 09 / 2021

Scale: 1 : 7,000 at A4



350000

351000

421000

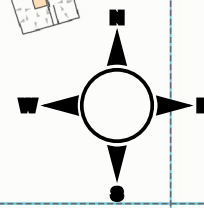
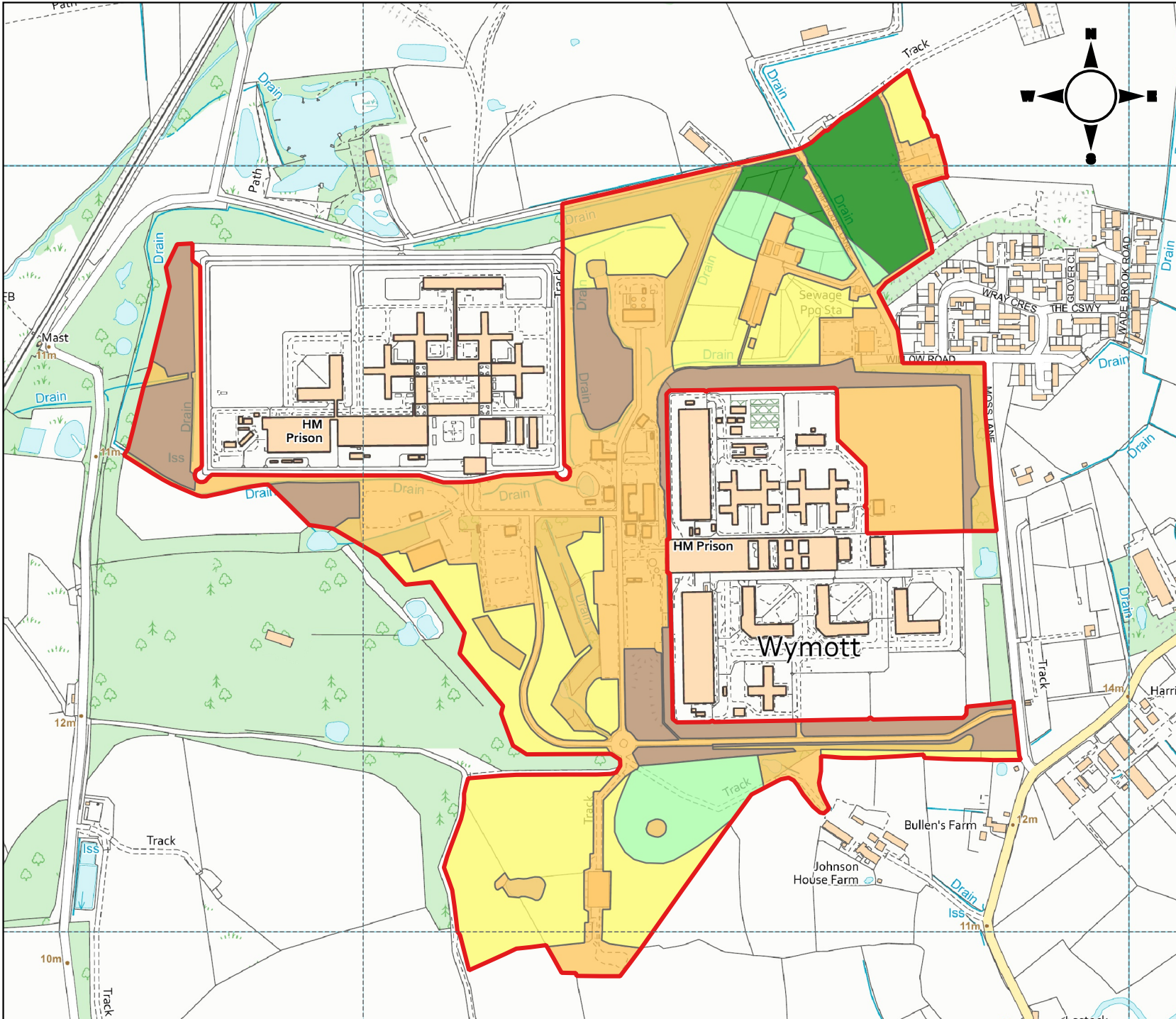
421000

420000

420000


350000







351000



Title
 Appendix 3: Map 3
 Agricultural Land Classification

Project
 Garth Wymott 2

Client


- Key**
-  Survey area
 -  Subgrade 3a
 -  Subgrade 3b
 -  Grade 4
 -  Grade 5
 -  Non-agricultural land

Date: 07 / 09 / 2021

Scale: 1 : 7,000 at A4



Appendix 4: Survey Details

Auger	Depth (cm)	Colour	Soil Profile							Agricultural Land Classification						
			Texture	Mottling	SPL	CaCO ₃	Stones (%)			Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
							Total	>2cm	>6cm Litho'							
1	0 - 30 30 - 57 57 - 80	V Dk Gr Br Bk + Dk Gr Li Br Gr + Gr	HCL C SC	- xxxx xxx	- yes no		0 0 0							4	WE	
2	0 - 30 30 - 62 62 - 85	V Dk Gr Br V Dk Gr Br Gr	SCL SCL CSL	- o xxxx	- no no		0 0 5					1		3a	3a WE	
3	0 - 33 33 - 50 50 - 75 75 - 90	Bk Gr + Li Br Gr Gr + Rd Gr Dk Rd Br	SCL MSL CSL C	- xxx xxx xxx	- no no yes		0 10 17 0					1 1		3a	3a WE	
4	0 - 27 27 - 50 50 - 58 58 - 90	Dk Gr Br V Dk Gr Br Rd Gr	HCL HCL MSL C	- xxx xxx xxx	- borderline no yes		0 0 5 0					1		4	4 WE	
5	0 - 25 25 - 37 37 - 90	V Dk Gr Br Dk Gr Rd Gr	HCL C C	- xxxx xxx	- yes yes		0 0 0							4	4 WE	
6	0 - 32 32 - 40 40 - 55 55 - 74 74 - 95	V Dk Gr Br V Dk Gr Gr Br Dk Rd Gr	SCL HCL SCL C Other	- xxxx xxx xxx xxx	- no no yes borderline		0 0 0 0 0							3b	3b WE	
7	0 - 30 30 - 90	V Dk Gr Br Rd Br	SCL C	- xxx	- yes		0 0							3b	3b WE	

Appendix 4: Survey Details

Auger	Depth (cm)	Colour	Soil Profile							Agricultural Land Classification							
			Texture	Mottling	SPL	CaCO ₃	Stones (%)			Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)	
							Total	>2cm	>6cm Litho'								
8	0 - 28 28 - 38 38 - 100	Dk Br V Dk Gr Gr	SCL MCL SCL	- o xxx	- no no		0 0 0					0	III	3a		3a	WE
9	Not surveyed - overburden soils									Soil bund.	3	III-IV	-		5	Other	
10	0 - 22 22 - 34	Br V Dk Gr Br	MSL MSL	- o	- no		15 20	12	1 1	Heavily disturbed ground. Stopped on bricks.	1	III-IV	-		5	Other	
11	0 - 28 28 - 85	V Dk Gr Br Br + Br	HCL C	- xxx	- yes		0 0				0	IV	4		4	WE	
12	0 - 26 26 - 60 60 - 90	Br Dk Br V Dk Gr Br	MCL MCL C	- o o	- no no		0 0 0			Disturbed ground	2	I	3b		3b	WE	
13	0 - 65	Dk Gr	HCL	xxxx	-		12		1	Soil bund.	1	III-IV	-		5	Other	
14	0 - 35	V Dk Gr Br	SCL	-	-		15		1	Soil bund. Stopped on stones.	6	III-IV	-		5	Other	

Appendix 4: Survey Details

Auger	Depth (cm)	Colour	Soil Profile							Agricultural Land Classification						
			Texture	Mottling	SPL	CaCO ₃	Stones (%)			Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
							Total	>2cm	>6cm							
15	0 - 20 20 - 50 50 - 80	Dk Gr Br Br Rd Gr + Dk Gr	HCL HCL HCL-C	- xxx xxx	- - -		5 5 5		1 1 1	Soil bund.	1	III-IV	-		5	Other
16	Not surveyed - non-agricultural															
17	0 - 42 42 - 69	V Dk Gr Br V Dk Gr	HCL HCL	- xxxx	- -		5 10		1 1	Soil bund. Brick fragments.	3	III-IV	-		5	Other
18	0 - 27 27 - 53 53 - 85	Dk Br Pi Gr + Gr Rd Gr + Rd Br	HCL HCL C	- xxx xxx	- no yes		0 0 0				1	IV	4		4	WE
19	0 - 25 25 - 40 40 - 85	Dk Br Br Dk Rd Gr	HCL HCL C	- xxx xxx	- borderline yes		0 0 0				1	IV	4		4	WE
20	0 - 20 20 - 33 33 - 90	Dk Br Li Gr Rd Gr + Rd Br	HCL HCL C	- xxxx xxx	- borderline yes		0 0 0				2	IV	4		4	WE
21	0 - 32 32 - 70	Dk Br Dk Gr	HCL HCL	- xxx	- -		1 1		1 1	Soil bund.	6	III-IV	-		5	Other

Appendix 4: Survey Details

		Soil Profile									Agricultural Land Classification					
Auger	Depth (cm)	Colour	Texture	Mottling	SPL	CaCO ₃	Stones (%)			Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)
								Total	>2cm	>6cm	Litho'					
22	0 - 35 35 - 80	V Dk Gr Br Gr	HCL ZC	- xxxx	- yes	0 0					1	IV	4		4	WE
23	0 - 38 38 - 85	V Dk Br Gr	HCL C	- xx	- yes	0 0					1	IV	4		4	WE
24	0 - 35 35 - 90	Bk Dk Gr	SCL C	- xxxx	- yes	0 0					0	IV	3b		3b	WE
25	0 - 22 22 - 48 48 - 90	V Dk Gr Br Li Gr + Pl Br Rd Br	HCL C C	- xxx xxx	- yes yes	3 0 0			1		0	IV	4		4	WE
26	0 - 50 50 - 75	V Dk Gr Br V Dk Gr Br + Br	HCL Other	- xxx	- borderline	10 15			1 1	Disturbed ground Hcl and clay	0	III	3b		3b	WE
27	0 - 30 30 - 80	Dk Br Gr	MCL C	- xxx	- yes	1 1			1 1		2	IV	3b		3b	WE
28	0 - 30	Dk Gr Br	HCL	-	-	0					1	IV	4		4	WE

Appendix 4: Survey Details

Auger	Depth (cm)	Colour	Soil Profile								Agricultural Land Classification						
			Texture	Mottling	SPL	CaCO ₃	Stones (%)			Notes	(°)	W C	WE grade	DR grade	Overall grade	Limit(s)	
							Total	>2cm	>6cm								Litho'
	30 - 40 40 - 90	Pl Br Rd Gr + Rd Br	C C	xxx xxx	yes yes		0 0										
29	0 - 34 34 - 54 54 - 90	V Dk Gr Br Gr + Pl Br Rd Gr + Rd Br	HCL C C	- xxx xxx	- yes yes		0 0 0					1	IV	4		4	WE
30	0 - 27 27 - 40 40 - 80	V Dk Gr Br + V Dk Gr Pl Br + Li Br Gr Rd Gr + Dk Gr	HCL C C	- xxx xxx	- yes yes		3 0 0			1		1	IV	4		4	WE

Key to Survey Notes:

Colour	Texture	Mottling	CaCO ₃
Bk - black Br - brown(ish) Bu – blue(ish) Dk - dark Du - dusky Gn - green(ish) Gr - grey(ish) Li - light OI - olive Pi - pink(ish) PI - pale Rd - red(dish) St - strong V - very Wk - weak YI - yellow(ish)	C - clay ZC - silty clay SC - sandy clay CL - clay loam (H-heavy, M-medium) ZCL - silty clay loam (H-heavy, M-medium) SCL - sandy clay loam SZL - sandy silt loam (F-fine, M-medium, C-coarse) ZL - silt loam SL - sandy loam (F-fine, M-medium, C-coarse) LS - loamy sand (F-fine, M-medium, C-coarse) S - sand (F-fine, M-medium, C-coarse) Org - organic (S-sand, L-loam, C-clay) Pty - peaty (S-sand, L-loam) Pt - peat (S-sandy, L-loamy, H-humified, SF-semi-fibrous, F-fibrous) R - bedrock	o – unmottled soil; x – a few (<2%) <i>ochreous</i> mottles; xx – common (2-20%) to many (20-40%) <i>ochreous</i> mottles <u>OR</u> <i>greyish</i> or <i>pale</i> soil, typically with a few <i>ochreous</i> mottles; xxx – <i>greyish</i> or <i>pale</i> colours dominant in matrix and/or ped faces and common to very many (>40%) <i>ochreous</i> mottles <u>OR</u> if <i>reddish</i> colours are dominant in the matrix, > 2% <i>greyish</i> , <i>brownish</i> or <i>ochreous</i> mottles or ferri-manganiferous concentrations, and dominantly <i>pale</i> coloured ped faces (gleyed horizon); xxxx – dominantly grey soil, often with some <i>ochreous</i> mottles (gleyed horizon). <i>'greyish'</i> , <i>'pale'</i> <i>'brownish'</i> , <i>'ochreous'</i> and <i>'reddish'</i> colours are assessed in the field using a Munsell Soil Colour Book and defined according to Appendix 3 of the ALC Guidelines.	non - non-calcareous v sl ca - very slightly calcareous sl ca - slightly calcareous ca - calcareous v ca - very calcareous Stone lithology 1 - all hard rocks or stones 2 - soft, medium or coarse grained sandstones 3 - soft 'weathered' igneous or metamorphic rocks or stones 4 - soft oolitic or dolomitic limestones 5 - soft fine grained sandstones 6 - soft, argillaceous or silty rocks or stones 7 - chalk or chalk stones 8 - gravel with non-porous stones 9 - gravel with porous stones
SPL		Notes	
yes - a slowly permeable layer. borderline - a borderline slowly permeable layer. no - not a slowly permeable layer.		FMCs – ferri-manganiferous concentrations	
Principal Limitation(s) to Agriculture			
CL - climate GR - gradient	DE - depth MR - microrelief	DR - droughtiness ST - stoniness	ER - erosion TX - texture FL - flooding WE - wetness
Droughtiness Calculation			
MDW - moisture deficit wheat (mm); MDP - moisture deficit potatoes (mm); MBW - moisture balance wheat (mm); MBP - moisture balance potatoes (mm); Grade W - droughtiness grade for wheat; Grade P - droughtiness grade for potatoes.			



ANALYTICAL REPORT

Report Number	63841-21	W195	MARTIN WORSLEY	Client A AND R ALC
Date Received	19-AUG-2021		ADAS GLEADTHORPE	SOIL 05-08-21
Date Reported	25-AUG-2021		MEDEN VALE	
Project	1010844		MANSFIELD	
Reference	A AND R ALC		NOTTINGHAMSHIRE	
Order Number	P69101MW1108		NG20 9PD	

Laboratory Reference		SOIL523659	SOIL523660	SOIL523661	SOIL523662	SOIL523663	SOIL523664	SOIL523665	SOIL523666		
Sample Reference		3	5	11	15	19	23	24	30		
Determinand	Unit	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL		
Sand 2.00-0.063mm	% w/w	53	23	38	37	34	40	50	40		
Silt 0.063-0.002mm	% w/w	23	39	31	30	31	27	24	29		
Clay <0.002mm	% w/w	24	38	31	33	35	33	26	31		
Organic Matter LOI	% w/w	8.4	6.5	7.6	6.1	9.4	12.0	8.4	7.8		
Textural Class **		SCL	C	HCL	HCL	C/HCL	O-HCL	SCL/MCL	HCL		

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.

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** Please see the attached document for the definition of textural classes.

APPENDIX 6 – DESCRIPTION OF ALC GRADES

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. The 'best and most versatile agricultural land' falls into grades 1, 2 and subgrade 3a – which collectively comprises about one-third of the agricultural land in England and Wales. About half the land in England and Wales is either of moderate quality (subgrade 3b) or poor quality (grade 4). Although less significant on a national scale, such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in grade 5, which mostly occurs in the uplands.

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 and horticultural crops can usually be grown but on some land in the 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.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where 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 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 agriculture land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.