



Agricultural Land Classification Land at Bilsham Road, Yapton

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Submitted to:
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1 Executive Summary

The Agricultural Land Classification of land adjacent to the urban edge to the west of Bilsham Road, Yapton, was assessed by ADAS in November 2015 with further fieldwork for a site extension to the south west in June 2017. The total site covers 11.61 ha of agricultural land.

The site which is proposed for development is almost level and the land lies at an altitude of approximately 4 metres A.O.D. At the time of the 2015 survey the field supported maize stubble.

The site is underlain by chalk deposits with river terrace material overlying the solid geology and the soils vary from moderately well to imperfectly drained. The fieldwork undertaken for this report indicates that the site is Agricultural Land Classification Grades 2 and Subgrade 3a due to the limitations imposed on crop growth by soil wetness and workability and soil drought.

2 Introduction

ADAS was instructed by Acorus Rural Property Services Ltd to undertake an Agricultural Land Classification (ALC) on a site situated west of Bilsham Road, Yapton, to inform a planning application for houses.

The land was classified using the system outlined in the Ministry of Agriculture, Fisheries and Food (MAFF, now Defra) publication: 'Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (October 1988).

3 Methodology

3.1 Fieldwork

A desk study of soils and climatic information was undertaken using reference material held by ADAS, followed by detailed fieldwork to study soil and site limitations.

Fieldwork was undertaken with a hand held 50 mm diameter "Dutch" auger and/or spade to a depth of 1m. In addition, soil pits were excavated to determine subsoil characteristics which could not be identified from the auger sample.

A total of 15 auger borings and 3 soil pits were examined to determine the quality of the land and the results are shown on the plan at **Appendix 1**. A brief description of the soil pits and auger profiles are given in **Appendix 2** and the results of laboratory analysis for topsoil particle size distribution are shown at **Appendix 3**.

The fieldwork was carried out on 24th November 2015 with further fieldwork undertaken on 31st May 2017, when the site was extended into an adjacent field to the south west of the initial site. This report describes the land quality of the amalgamated areas.

3.2 The Agricultural Land Classification System

The ALC provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. 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 yield*
- *the consistency of yield*
- *the cost of obtaining the crop*

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

The principal physical factors influencing agricultural production are climate, site (including relief) and soil. By assessing these factors, it is possible to assign land into one of five land classification grades; Grade 1 land being the highest quality and Grade 5 the lowest quality land. Grade 3 is sub-divided into Subgrades 3a and 3b, to identify good quality agricultural land from moderate quality land (see *Appendix 4* for a description of the grades used in the ALC system). By considering site-specific climate, site and soil factors, the land can be classified into 1 of 5 agricultural grades or certain non-agricultural grades, the results of which are detailed in sections 6.4 and 6.5.

4 Geology, Soils and Present Land Use

4.1 Geology

The geology map¹ shows the site to be underlain by a grouping of chalk deposits including the Nodular, Seaford, Newhaven and Culver Chalk Formations, which are sedimentary bedrocks laid down in warm chalk seas, 71-94 million years ago in the Cretaceous Period. Overlying the solid geology are superficial deposits of River Terrace material laid down up to three million years ago in the Quaternary Period. The resulting soils are mapped on the soil maps² of the area as Park Gate Association on the boundary with Hamble 2 Association. Both Associations include silty soils, some of which have heavier subsoils or are affected by groundwater. The survey undertaken for this report located soils which are more typical of the heavier soil type.

4.2 Soils

The topsoils are typically medium silty clay loam overlying medium and heavy silty clay loam subsoils. The topsoils are not calcareous. The heavier soils show signs of impeded drainage in the form of gley colours and mottling. They can be affected by groundwater but with land drainage fall into Wetness Class 1 (WC 1) and WC 2 (i.e. well to moderately well drained). On the low lying areas the soils are less well drained and typically fall into WC3. The soils contain few stones throughout the profile.

4.3 Present Land Use

At the time of survey in November 2015, the site supported maize stubble after the recent harvest. Field edges were wide and covered in tall grass and brambles, especially in the most northern field. The small extension area supported pasture which in 2017 was cut for hay.

The site is wrapped around the urban edge and so is bordered by houses in the east and north and by agricultural land on the other boundaries. The site is adjacent to Bilsham Road at the extreme south eastern end.

5 Previous Agricultural Land Classification Surveys

The Provisional Agricultural Land Classification Maps show the site as an area on the boundary between Grade 1 and Grade 2 land. The Provisional maps are not accurate for use on small sites and do not classify land into Subgrades 3a and Subgrade 3b to differentiate between better quality (Subgrade 3a) and lower quality (Subgrade 3b) land.

The Magic websiteⁱⁱⁱ indicates that this site was classified by Natural England as part of a larger survey in April 1994; the site was mapped then as Grades 2 and Subgrade 3a. Fieldwork to support this planning application has confirmed the presence of these grades.

6 Results

The sections below illustrate the main considerations and limitations to the grading of the land.

6.1 Climate

The site climatic variables have been interpolated from grid point data surrounding the site, as follows:

Table 1: Climatic Variables

Grid Reference (mid-point of site)	SU975030	SU974028
Altitude (m)	4	5
Accumulated Temperature (day °C)	1544	1543
Average Annual Rainfall (mm)	749	749
Overall Climatic Grade	1	1
Field Capacity Days	153	153
Moisture deficit (mm): Wheat	120	120
Moisture deficit (mm): Potatoes	117	117

The site lies close to the coast in southern England and so has a warm moist climate. Accumulated Temperature (January–June), a measure of the relative warmth of the area, is 1543-1544°C and the average annual rainfall is 749 mm.

This combination of rainfall and temperature indicates that the area is warm and moist, making it good for crop growth so long as the soils hold sufficient water to protect crops against drought and the soils are freely drained. There is no overriding climatic limitation to the classification of the land.

6.2 Site Limitations

Slope: The site is almost level but contains very shallow depressions which are not as well drained and tend to be heavier textured.

Flooding: The site lies away from any designated floodplain and is not prone to flooding from rivers and sea or from any significant area of surface water ponding^{iv}.

6.3 Soil and Interactive Limitations

The soils show signs of seasonal wetness in the form of pale and grey colours and mottling in the subsoils, but the soils are not slowly permeable near the surface and the majority of the site falls into WC 2 with lower lying areas falling into WC 3.

The main factors affecting land quality in this area are:

- * *Soil wetness and workability due to seasonally wet subsoils; and*
- * *Soil texture and soil moisture deficit, which mainly affect the ALC grade due to a droughtiness limitation.*

All other limitations such as gradient and stone content are less severe and have not affected the final grading of the land.

6.4 Land Quality

The land quality of the site is shown on the attached plan (*Appendix 1*).

Grade 1

No land has been placed in this grade.

Grade 2

This Grade accounts for 67.2% of the survey area. The land is level and the soils are deep and only very slightly stony; they have:

- * *A light textured medium silty clay loam topsoil, are gleyed and mottled within 400mm and have a slowly permeable layer starting at depths below 690mm of the soil surface and so fall into WC 2;*
or
- * *Are gleyed at depths below 400mm and slowly permeable within 540mm of the surface and so fall into WC 2;*
and
A slight susceptibility to drought in dry years having a moisture balance of between +30mm and +5mm for wheat and +10 and -10 for potatoes

In this location soils with medium textured topsoils which fall into WC 2 cannot be graded higher than Grade 2.

Soil wetness and workability are the main limitations to the classification of this land, but soil droughtiness is also a slightly limiting factor in some profiles. This land is capable of producing high yields of a wide range of crops including horticultural crops but yields can be more variable than on Grade 1 land.

Grade 3, Subgrade 3a

This Grade accounts for 32.8% of the survey area. The land is almost level and the soils are deep and only very slightly stony, they have:

- *A medium silty clay loam topsoil over similar and heavier textured subsoils. They are gleyed and mottled within 400mm and have a slowly permeable layer starting at depths between 420 - 690mm of the soil surface and so fall into WC 3.*

In this location soils with a medium silty clay loam topsoil which fall into WC 3 cannot be graded higher than Subgrade 3a.

Soil wetness and workability are the main limitations to the classification of this land. This land is capable of producing moderate to high yields of a narrower range of crops.

Grade 3, Subgrade 3b

No land has been placed in this grade.

Grade 4

No land has been placed in this grade.

Grade 5

No land has been placed in this grade.

6.5 Summary of Land Quality in the Survey Area

Table 2: Agricultural Land Classification Measurements

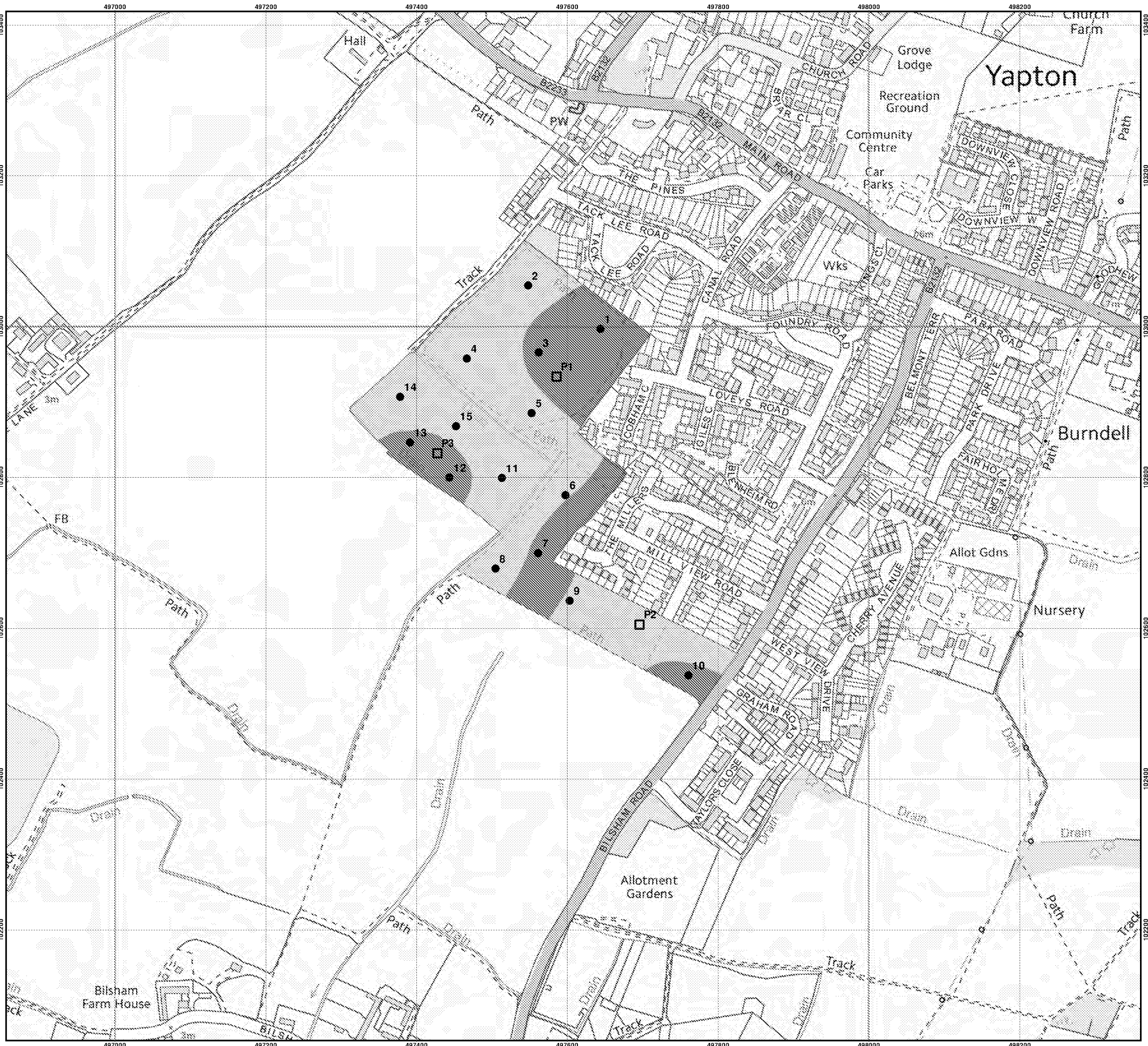
Grade	Area (ha)	% of Total Area
1	-	-
2	7.80	67.2
3a	3.80	32.8
3b	-	-
4	-	-
5	-	-
Non Agricultural	-	-
Total	11.60	100.00

7 Conclusions

- *The Provisional ALC maps, produced in the 1970s, classified the site as on the boundary between Grade 1 and Grade 2 land. However, the provisional mapping exercise was not meant to give a detailed grading of small parcels of land and so the site has been classified again, using the current ALC guidelines.*
- *A detailed survey was undertaken in 1994 by Natural England; this survey classified the land as a mix of Grades 2 and Subgrade3a.*
- *Fieldwork undertaken for this ADAS report located soils which were medium textured and land quality was limited by soil wetness and workability limitations to Grade 2 and Subgrade 3a; thus roughly confirming the NE survey although a larger area of Subgrade 3a was located (32.8% of the site).*
- *If the land is developed a soil handling strategy should be developed which aims to preserve the soils. Surplus soil could be used on site or to restore other sites which are short of soil, to preserve the soil and retain soil functions such as water and carbon storage.*

Appendix 1: Agricultural Land Classification Map and Location Plan

See following page



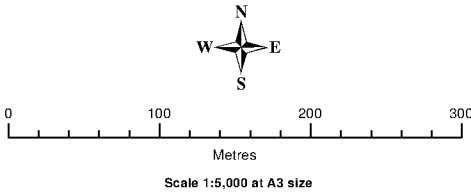
ADAS

Land South of Bilsham Road,
Yapton, West Sussex

Agricultural Land Classification Survey

- Auger boring
- Soil pit
- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Non Agricultural
- Urban
- Other

Drawn by Andy Frost 28/06/2017, Verified by Rosemary Peel 28/06/2017



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CEN4168

Appendix 2: Soil Descriptions

See following page

PIT AND BORING DESCRIPTIONS

SITE: Yapton

Keys common to all tables

Texture Key

S = sand
Z = silt
C = clay
L(y) = loam(y)

F = fine
M = medium
C = coarse
Pt(y) = peat(y)

Structure Key

(V)Wk = (very)weak
F = fine
SG = single grain

M = moderate
M = medium
GR = Granular
AB = angular blocky

S = strong
C = coarse
SAB = subangular blocky
PR = prismatic

Colour key

Br = brown
Rd = red
Ol = olive

Bl = black
Or = orange

Yl = yellow
pl = pale

Main Limitation

DR = Drought
GR = Gradient

WE = Wetness
MR = Microrelief

CL = Climate
TX = Texture

Land use

Wht = wheat

Bar = barley

perm past = permanent
pasture
r&f = ridge and furrow

Osr = oil seed rape

fal = fallow

Others abbreviations

ab = abundant
MB = moisture balance
occ = occasional/ly
pot = potatoes
SPL = slowly permeable layer
OM = organic matter

cons = concretions
Mn = manganese
och = ochreous
sat = saturated
na = not applicable
rrm = rusty root mottles

imp = impenetrable
mot = mottles
pok = pockets

Site: Yapton

PIT DESCRIPTIONS

Pit	Depth (mm)	Colour	Texture	Structure	Drainage /Porosity	Total Stone
1	320 (psd)	10YR5/3, br	MZCL	M,F,SAB	-	<1
	570	10YR6/4 lt yl br	MZCL	Wk,C,PR to M,M,SAB, friable	Och few/>	<5
	700	10YR6/2 lt br gr	HZCL	Platy to Wk C,AB, firm	Och many + Fe & Mn cons/<	<5
	1000	Lt br	HZCL	Augered	Och com	Few
	Gleyed at: 320mm	SPL at: 570mm	Wetness class: 3	Wetness grade: 3a	Comments: Compact layer at 330mm	
		MB wheat: +48mm MB pot: +16mm	DR Grade: 1	Main limitation. We		ALC grade 3a



Pit 1



View of site

Pit	Depth (mm)	Colour	Texture/	Structure	Drainage /Porosity	Total Stone
2	350	10YR5/4 yl br	MZCL	M,F,Gr to SAB but compact at 300	-	<1
	620	10YR5/3 br (pl)	MZCL	Wk,C,SAB, friable	Och few/>	<1
	800	10YR5/6 yl br	MZCL	Wk,C,SAB, friable	Och com/>	<1
	1000+	10YR5/6 yl br, 5/2 ped faces	M/HZCL	Augered,	Och com	
	Gleyed at: 350mm	SPL at: >800mm	Wetness class: 2	Wetness grade: 2	Comments: Pan at 300 – 350mm.	
		MB wheat: +17mm MB pot: +4mm	DR Grade: 2	Main limitation. WE/DR		ALC grade 2



Pit 2



view of site

Pit	Depth (mm)	Colour	Texture	Structure	Drainage/Porosity	Total Stone
3	260 (psd)	7.5YR4/2, br	MZCL	M,M,SAB	Occ rrm	<2 flint
	400	10YR5/3 br (pl)	MZCL	M,C,PR to M,C,AB, friable	Och com/>	<2
	650	10YR6/3 pl br	MZCL	M,C,PR, friable	Och many />	<2
	850	10YR6/3 pl br	MZCL	Platy, firm	Och many + Fe & Mn cons/<	<2
	1200	Lt br	HZCL	Augered	Och many + Fe cons	Few
	Gleyed at: 260mm	SPL at: 650mm	Wetness class: 3	Wetness grade: 3a	Comments: Compact layer at 330-370mm	
		MB wheat: +48mm MB pot: +16mm	DR Grade: 1	Main limitation. We		ALC grade 3a



View of extension land



Pit 3

AUGER BORING DESCRIPTIONS

Land use: fallow after maize. Gradient: almost level , with slightly lower hollows.									
No /	Bottom Depth of horizon	Texture	Colour	Gleyed / spl	% Stone >2cm /total	Drought MB Wheat /pots	Wetness Class	Main Limit- ation	Grade
1	330	MZCL	Yl br	-	<1				
	380	MZCL	Br (pl)	Och com	Few				
	570	MZCL	Pl br	Och many	Few				
	1000	HZCL	Lt yl br	Och many	Few		3	We	3a
Slight depresssion									
2	350	MZCL	Br	-	<1				
	750	MZCL + SZL poks	Lt yl br	Och com, many by 600	Few				
	1000	HZCL	Lt yl br	Och ab	Few	+51/+22	2	We	2
3	350	MZCL	Br	-	<1				
	520	MZCL	Lt br	Faint och com + Mn cons	Few				
	1000	HZCL	Lt yl br	Och many + Fe cons	Few		3	We	3a
4	330	MZCL/ZL	Br	-	<1				
	650	MZCL	Lt yl br	Faint och few	Few				
	1000	HZCL	Lt yl br	Och ab + Fe cons	Few		2	We	2
5	320	MZCL	Br	-	<1				
	720	MZCL	Lt yl br	Och many by 350	Few				
	1000	HZCL	Yl br + gr	Och ab	Few		2	We	2
6	320	MZCL	Br	-	<1				
	350	MZCL	Gr br	SI compact and anaerobi c	Few				
	690	HZCL	Lt yl br	Och com	Few				
	1000	HZCL	Lt yl br	Och many	Few		3/2	We	2/3a
7	320	MZCL	Br	-	<1				
	520	MZCL	Lt yl br	Och com	Very sl st				

	720	HZCL	Lt yl br	Och many	Few				
	750+	HZCL + gravel	Yl br	Och com	Mod st		3	We	3a
Slight hollow by houses – old stream bed, groundwater									
8	370	MZCL	Br	-	<1				
	560	MZCL	Lt yl br	-	Few				
	1000	HZCL, heavier with depth	Lt yl br	Och many + Fe & Mn cons	Few	+47/+16	2	We	2
9	350	MZCL	Br	-	<1				
	580	MZCL	Lt yl br	Och few by 500	Few				
	750	HZCL	Lt yl br	Och many + Mn cons	Few				
	1000	HZCL	Lt yl br	Och com	Sl st – chalk frags		2	We	2
10	350	MZCL	Br	-	<1				
	550	MZCL	Lt yl br	Och many	Few				
	1000	HZCL	Lt yl br	Och many	Few		3	We	3a
11	250	MZCL	Br	-	<1				
	780	MZCL	Pl br	Och few, com by 630	Few				
	1000	HZCL	Pl br	Och many, + Mn & Fe cons	Few		2	We	2
12	250	MZCL	Br	-	<1				
	550	MZCL	Yl br	Och many + Mn cons	Few				
	800+	HZCL	Yl br + gr	Och many, + Mn & Fe cons	Few		3	We	3a
13	240	MZCL, sl org to 100	Dk Br	Occ rrm	<1				
	470	MZCL	Br, grey ped faces	Och many + Mn cons	Few				
	1000+	HZCL	Pl br	Och many, + Mn & Fe cons	Few		3	We	3a
14	250	MZCL	Br	-	<1				

	780	MZCL	PI br	Och few, com by 630	Few				
	1000	HZCL	PI br	Och many, + Mn &Fe cons	Few		2	We	2
15	250	MZCL	Br	-	<1				
	780	MZCL	PI br	Och few 250-350, none below until 550.	Few				
	1000	HZCL	PI br	Och many, + Mn &Fe cons	Few		2	We	2

Appendix 3: Laboratory Analysis

See following page



ANALYTICAL REPORT

Report Number 89654-15 X922 ROSEMARY PEEL
 Date Received 27-NOV-2015 ADAS ENVIRONMENT GROUP
 Date Reported 04-DEC-2015
 Project PE DM12 SOILS 241115
 Reference BILSHAM RD YAPTON
 Order Number

Laboratory Reference		SOIL291293	SOIL291294								
Sample Reference		PIT 1 0-250MM	PIT 2 0-250MM								
Determinand	Unit	SOIL	SOIL								
Sand 2.00-0.063mm	% w/w	11	12								
Silt 0.063-0.002mm	% w/w	71	70								
Clay <0.002mm	% w/w	18	18								
Textural Class **		28	28								

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 *Ross Warner*
 Natural Resource Management, a trading division of Cawood Scientific Ltd.
 Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS
 Tel: 01344 886338
 Fax: 01344 890972
 email: enquiries@nrm.uk.com



ANALYTICAL REPORT

Report Number	61820-17	X922	ROSEMARY PEEL	Client YAPTON LANGMEAD DROVE
Date Received	05-JUN-2017		RSK ADAS LTD	31-05-2017
Date Reported	12-JUN-2017		PARKFIELD COTTAGE	
Project	SOIL		POLLARDS LANE	
Reference	YAPTON LANGMEAD DROV		SOUTHWELL	
Order Number			NOTTS NG25 0TL	

Laboratory Reference	SOIL344596										
Sample Reference	YAPTON EXT ENSION PT1										
Determinand	Unit	SOIL									
Sand 2.00-0.063mm	% w/w	10									
Silt 0.063-0.002mm	% w/w	70									
Clay <0.002mm	% w/w	20									
Textural Class **		MZCL									

Notes	
Analysis Notes	The sample submitted was of adequate size to complete all analysis requested. The results as reported relate only to the item(s) submitted for testing. The results are presented on a dry matter basis unless otherwise stipulated.
Document Control	This test report shall not be reproduced, except in full, without the written approval of the laboratory.

Reported by	** Please see the attached document for the definition of textural classes. Katie Dunn Natural Resource Management, a trading division of Cawood Scientific Ltd. Coopers Bridge, Braziers Lane, Bracknell, Berkshire, RG42 6NS Tel: 01344 886338 Fax: 01344 890972 email: enquiries@nrm.uk.com
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Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

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

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

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

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

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

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

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

Appendix 4: Description of the Grades and Subgrades

The ALC grades and Subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to the land's physical characteristics, for which the cut-offs are described in Section 3. The most productive and flexible land falls into Grades 1, 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land 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.

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

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural 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.

Appendix 5: References

ⁱ <http://www.bgs.ac.uk/data/mapViewers/>

ⁱⁱ SSEW 1983 Soils of South East England

ⁱⁱⁱ magic.defra.gov.uk/

^{iv} <http://www.environment-agency.gov.uk/homeandleisure/37793.aspx>