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Guildford Borough Local Plan
University of Surrey

Agricultural Land Classification
ALC Map and Report

Reconnaissance Survey

July 1997

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number 4003/94/97
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AGRICULTURAL LAND CLASSIFICATION REPORT

GUILDFORD BOROUGH LOCAL PLAN
UNIVERSITY OF SURREY

INTRODUCTION

1 This report presents the findings of a reconnaissance Agricultural Land Classification (ALC) survey of 339 hectares of land to the west of the University of Surrey playing fields and the Surrey Research Park, on the western edge of Guildford The site is bounded by the A31 Hog s Back along the southern boundary The survey was carried out during July 1997

2 The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture Fisheries and Food (MAFF) in connection with MAFF s statutory input to the Guildford Borough Local Plan This survey supersedes any previous ALC information for this land

3 The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF 1988) A description of the ALC grades and subgrades is given in Appendix I

4 At the time of survey the land use on the site was mostly wheat on the cultivated land with some areas of grassland The areas mapped as Other land include woodland farm buildings tracks and houses and gardens

SUMMARY

5 The findings of the survey are shown on the enclosed ALC map The map has been drawn at a scale of 1 20 000 It is accurate at this scale but any enlargement would be misleading

6 The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1

Table 1 Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	18 0	7 7	5 3
3a	56 7	24 2	16 7
3b	155 7	66 4	45 9
4	4 1	1 7	1 2
Other land	104 7	N/A	30 9
Total surveyed area	234 5	100	69 1
Total site area	339 2		100

[1] FRCA is an executive agency of MAFF and the Welsh Office

7 The fieldwork was conducted at an average density of just less than one boring per four hectares of agricultural land A total of 57 borings and 4 soil pits was described

8 The area of Grade 2 (very good quality agricultural land) is affected by a minor soil droughtiness or soil wetness limitation Sandy loam topsoils and upper subsoils may overlie lower subsoils of clay which obstruct the drainage and cause the slight wetness limitation or may remain light textured to depth but do not have sufficient reserves of water to overcome the slight droughtiness limitation

9 The area of Subgrade 3a (good quality agricultural land) also has wetness and droughtiness as the main limiting factors There is a mixture of soils here Some are similar to the Grade 2 land that is affected by soil wetness with the lower subsoil clay layer occurring higher up the profile creating a more significant soil wetness limitation Some contain chalk rubble and chalk at relatively shallow depths which restrict the amount of water available for extraction by roots thereby increasing the droughtiness limitation

10 The northern area of Subgrade 3b (moderate quality agricultural land) encompasses all of the soils developed on the London Clay Here the underlying geology has given rise to heavy profiles with clay horizons below the topsoil that significantly restrict the drainage The southern area of Subgrade 3b includes soils developed on Chalk which are either steeply sloping and experience a significant gradient limitation or are shallow over the chalk and experience a significant droughtiness limitation

11 The area of Grade 4 (poor quality agricultural land) defines the most steeply sloping land in the south of the site on the Hog s Back

FACTORS INFLUENCING ALC GRADE

Climate

9 Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics

10 The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met Office 1989)

11 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions

12 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR) as a measure of overall wetness and accumulated temperature (AT0 January to June) as a measure of the relative warmth of a locality Given the size of the site the range in altitude and the variation in topography the site was spilt into three climatic zones before fieldwork commenced These three zones represent areas where the important climatic variables moisture deficits for wheat and potatoes and field capacity days vary little and a representative interpolation has been used within each zone The boundaries of the zones have been identified by carrying out 18 climatic interpolations across the site

Details for the three zones are given in Table 2 Zone 1 includes all the lower-lying land in the north of the site Zone 2 includes the central belt up to the 120 m contour in the south Zone 3 includes all of the higher land in the south above 120 m

13 The combination of rainfall and temperature at this site mean that there is no overall climatic limitation In addition, no local factors such as frost risk or exposure are believed to be significant enough to downgrade the land The site is climatically Grade 1

Table 2 Climatic and altitude data

Factor	Units	Values		
Climatic Zone		Zone 1	Zone 2	Zone 3
Example Grid Reference	N/A	SU959497	SU974493	SU960486
Altitude	m, AOD	80	85	145
Accumulated Temperature	day°C (Jan June)	1437	1431	1363
Average Annual Rainfall	mm	716	729	761
Field Capacity Days	days	150	150 155	>155
Moisture Deficit, Wheat	mm	108	106	98
Moisture Deficit Potatoes	mm	102	99	89
Overall climatic grade	N/A	Grade 1	Grade 1	Grade 1

Site

14 A range of topography exists on the site In the extreme south the north facing slopes of the Hog s Back result in steep gradients and altitudes in the range 110–145 m To the north of this is a gently rolling landscape with altitudes in the range 70–110 m Gradients are limiting in the south of the site but not elsewhere microrelief and flooding are not significant anywhere in the site

Geology and soils

15 The most detailed published geological information for the site (BGS 1976) shows the higher land of the Hog s Back to comprise Upper Chalk Adjacent to this to the north, is a narrow parallel band of Reading Beds Further north, the rest of the site comprises London Clay with one small north-south band of river gravels to the west of Blackwell Farm

16 The most detailed published soils information for the site (SSEW 1983 and 1984) shows soils of the Upton 1 Association over the Upper Chalk, soils of the Frilsham Association over the Reading Beds and soils of the Wickham 4 Association over the London Clay

17 The Upton 1 soils are described as shallow well-drained calcareous silty soils over chalk The Frilsham soils are described as well drained mainly fine loamy soils over chalk some calcareous Shallow calcareous fine loamy and fine silty in places The Wickham 4 soils are described as slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey These broad descriptions accord reasonably well with what was found during the fieldwork but there was quite a degree of variation in the soils developed over the Reading Beds and the London Clay

AGRICULTURAL LAND CLASSIFICATION

18 The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1 page 1

19 The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II

Grade 2

20 A small belt of very good quality agricultural land has been mapped in the centre-west of the site just south of Wildfield Copse Both soil wetness and soil droughtiness limit this land to Grade 2 A soil pit Pit 2 has been located in this unit and is representative of these soils Light textured topsoils and upper subsoils (FSLs) show evidence of gleying within 40 cm caused by the presence of a slowly permeable layer (of C or SC texture) starting at a depth between 45–60 cm These soils are placed in Wetness Class III which, in combination with the light topsoils and the field capacity level (>150 days) limits the land to Grade 2 Pit 2 was described to depth and also showed that there was a slight droughtiness limitation, based around the moisture balance for potatoes There will thus be insufficient water at critical times of the growing season, and the level and consistency of yields from this land will be slightly affected

Subgrade 3a

21 A narrow band of good quality agricultural land is situated towards the south of the site broadly corresponding with the Reading Beds geology This is a map unit with a degree of variation within it It contains for example some Grade 2 borings which have not been delineated separately at this scale

22 Some soils experience a droughtiness limitation They are generally developed over chalk as Pit 4 illustrates Topsoils are generally medium clay loams with approximately 15% stone subsoils are similarly stony and slightly siltier Chalk occurs in the pit within 60 cm and rooting has been assumed to be able to extend a further 25 cm into the chalk These characteristics limit the amount of water that is available for extraction by roots causing the droughtiness limitation that will be most effective in drier years and at critical times in the growing season The levels and the consistency of the yields on this land will be less than the adjacent Grade 2 land Some soils within this map unit were impenetrable at shallow depths given the dry soil conditions at the time of fieldwork and the stony nature of some of the subsoils They have been assumed to be broadly similar to Pit 4

23 Other soils show clear evidence of a wetness limitation They are not dissimilar to the wet soils of the Grade 2 unit falling into Wetness Class III but have heavier topsoils (MCL) which make them less workable

Subgrade 3b

24 The south of the site and the majority of the land in the north have been classified as moderate quality agricultural land In the south the slopes of the Hog s back have gradients that restrict the land to Subgrade 3b Adjacent to these slopes but where the gradient itself is

not limiting shallow chalky soils experience a significant soil droughtiness limitation Pit 3 has been located in these soils and illustrates the droughtier end of this range At the pit chalk occurs within 30 cm with rooting assumed to be possible for a further 35 cm These characteristics technically limit the pit to Grade 4 but the depth to the chalk varies sufficiently within this unit to allow Subgrade 3b to be the most appropriate classification for this land

25 To the north of the site on the London Clay geology soil wetness is the main limiting factor Pit 1 is representative of these soils and describes a gleyed clay topsoil overlying a slowly permeable clay subsoil This land is placed in Wetness Class IV and can be graded no higher than Subgrade 3b This degree of wetness will limit the range of crops that can tolerate such conditions as well as significantly restricting the number of days when the soil is in a suitable condition for cultivations or grazing by livestock without causing structural damage

Grade 4

26 The steepest land on the Hog s Back in the south of the site has gradients in excess of 11 degrees producing poor quality agricultural land

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SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No 285 Aldershot*
BGS London

Ministry of Agriculture Fisheries and Food (1988) *Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land*
MAFF London

Met Office (1989) *Climatological Data for Agricultural Land Classification*
Met Office Bracknell

Soil Survey of England and Wales (1983) *Sheet 6 South East England*
SSEW Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW Harpenden

APPENDIX I

DESCRIPTIONS OF THE GRADES AND SUBGRADES

Grade 1 Excellent Quality Agricultural Land

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

Grade 2 Very Good Quality Agricultural Land

Land with minor limitations which affect crop yield cultivations or harvesting A wide range of agricultural or horticultural crops can usually be grown but on some land of this grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops The level of yield is generally high but may be lower or more variable than Grade 1 land

Grade 3 Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops the timing and type of cultivation harvesting or the level of yield When more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2

Subgrade 3a Good Quality Agricultural Land

Land capable of consistently producing moderate to high yields of a narrow range of arable crops especially cereals or moderate yields of a wide range of crops including cereals grass oilseed rape potatoes sugar beet and the less demanding horticultural crops

Subgrade 3b Moderate Quality Agricultural Land

Land capable of producing moderate yields of a narrow range of crops principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year

Grade 4 Poor Quality Agricultural Land

Land with severe limitations which significantly restrict the range of crops and/or the level of yields It is mainly suited to grass with occasional arable crops (e g cereals and forage crops) the yields of which are variable In moist climates yields of grass may be moderate to high but there may be difficulties in utilisation The grade also includes very droughty arable land

Grade 5 Very Poor Quality Agricultural Land

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

APPENDIX II

SOIL DATA

Contents

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a computer database This uses notations and abbreviations as set out below

Boring Header Information

1 **GRID REF** national 100 km grid square and 8 figure grid reference

2 **USE** Land use at the time of survey The following abbreviations are used

ARA	Arable	**WHT**	Wheat	**BAR**	Barley
CER	Cereals	**OAT**	Oats	**MZE**	Maize
OSR	Oilseed rape	**BEN**	Field beans	**BRA**	Brassicae
POT	Potatoes	**SBT**	Sugar beet	**FCD**	Fodder crops
LIN	Linseed	**FRT**	Soft and top fruit	**FLW**	Fallow
PGR	Permanent pasture	**LEY**	Ley grass	**RGR**	Rough grazing
SCR	Scrub	**CFW**	Coniferous woodland	**OTH**	Other
DCW	Deciduous woodland	**BOG**	Bog or marsh	**SAS**	Set Aside
HTH	Heathland	**HRT**	Horticultural crops	**PLO**	Ploughed

3 **GRDNT** Gradient as estimated or measured by a hand held optical clinometer

4 **GLEY/SPL** Depth in centimetres (cm) to gleying and/or slowly permeable layers

5 **AP (WHEAT/POTS)** Crop adjusted available water capacity

6 **MB (WHEAT/POTS)** Moisture Balance (Crop adjusted AP - crop adjusted MD)

7 **DRT** Best grade according to soil droughtiness

8 If any of the following factors are considered significant 'Y' will be entered in the relevant column

MREL	Microrelief limitation	**FLOOD**	Flood risk	**EROSN**	Soil erosion risk
EXP	Exposure limitation	**FROST**	Frost prone	**DIST**	Disturbed land
CHEM	Chemical limitation				

9 **LIMIT** The main limitation to land quality The following abbreviations are used

OC	Overall Climate	**AE**	Aspect	**ST**	Topsoil Stoniness
FR	Frost Risk	**GR**	Gradient	**MR**	Microrelief
FL	Flood Risk	**TX**	Topsoil Texture	**DP**	Soil Depth
CH	Chemical	**WE**	Wetness	**WK**	Workability
DR	Drought	**ER**	Erosion Risk	**WD**	Soil Wetness/Droughtiness
EX	Exposure				

Soil Pits and Auger Borings

1 **TEXTURE** soil texture classes are denoted by the following abbreviations

S	Sand	**LS**	Loamy Sand	**SL**	Sandy Loam
SZL	Sandy Silt Loam	**CL**	Clay Loam	**ZCL**	Silty Clay Loam
ZL	Silt Loam	**SCL**	Sandy Clay Loam	**C**	Clay
SC	Sandy Clay	**ZC**	Silty Clay	**OL**	Organic Loam
P	Peat	**SP**	Sandy Peat	**LP**	Loamy Peat
PL	Peaty Loam	**PS**	Peaty Sand	**MZ**	Marine Light Silts

For the sand loamy sand sandy loam and sandy silt loam classes the predominant size of sand fraction will be indicated by the use of the following prefixes

F Fine (more than 66% of the sand less than 0 2mm)
M Medium (less than 66% fine sand and less than 33% coarse sand)
C Coarse (more than 33% of the sand larger than 0 6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content
M Medium (<27% clay) **H** Heavy (27 35% clay)

2 **MOTTLE COL** Mottle colour using Munsell notation

3 **MOTTLE ABUN** Mottle abundance expressed as a percentage of the matrix or surface described

F few <2% **C** common 2 20% **M** many 20-40% **VM** very many 40% +

4 **MOTTLE CONT** Mottle contrast

F faint indistinct mottles evident only on close inspection
D distinct - mottles are readily seen
P prominent mottling is conspicuous and one of the outstanding features of the horizon

5 **PED COL** Ped face colour using Munsell notation

6 **GLEY** If the soil horizon is gleyed a Y will appear in this column If slightly gleyed, an S will appear

7 **STONE LITH** Stone Lithology one of the following is used

HR	all hard rocks and stones	**FSST**	soft fine grained sandstone
ZR	soft argillaceous or silty rocks	**CH**	chalk
MSST	soft medium grained sandstone	**GS**	gravel with porous (soft) stones
SI	soft weathered igneous/metamorphic rock	**GH**	gravel with non porous (hard) stones

Stone contents (>2cm >6cm and total) are given in percentages (by volume)

8 **STRUCT** the degree of development, size and shape of soil peds are described using the following notation

Degree of development	**WK**	weakly developed	**MD**	moderately developed
	ST	strongly developed		
Ped size	**F**	fine	**M**	medium
	C	coarse		
Ped shape	**S**	single grain	**M**	massive
	GR	granular	**AB**	angular blocky
	SAB	sub angular blocky	**PR**	prismatic
	PL	platy		

9 **CONSIST** Soil consistence is described using the following notation

L loose	**FM** firm	**EH** extremely hard
VF very friable	**VM** very firm	
FR friable	**EM** extremely firm	

10 **SUBS STR** Subsoil structural condition recorded for the purpose of calculating profile droughtiness **G** good **M** moderate **P** poor

11 **POR** Soil porosity If a soil horizon has less than 0 5% biopores >0 5 mm, a 'Y' will appear in this column

12 **IMP** If the profile is impenetrable to rooting a 'Y will appear in this column at the appropriate horizon

13 **SPL** Slowly permeable layer If the soil horizon is slowly permeable a 'Y will appear in this column

14 **CALC** If the soil horizon is calcareous a 'Y will appear in this column

15 Other notations

APW	available water capacity (in mm) adjusted for wheat
APP	available water capacity (in mm) adjusted for potatoes
MBW	moisture balance wheat
MBP	moisture balance potatoes

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
4	SU955 503	PGR	NW	3	28	28	4	3B	82	-26	88	-14	B				WE	3B	
9	SU960 503	WHT	SW	6	28	28	4	3B	65	-43	77	-25	B				WE	3B	
15	SU952 502	WHT	NW	4	000	28	4	3B	65	-43	77	-25	B				WE	3B	
20	SU957 502	WHT	E	2	20	20	4	3B	54	-54	66	-36	4				WE	3B	
27	SU964 502	WHT	E	3	000	38	4	3B	88	-20	94	-8	A				WE	3B	
38	SU962 501	WHT			30	30	4	3B	66	-42	78	-24	B				WE	3B	
47	SU958 500	WHT			30	30	4	3B	65	-43	77	-25	B				WE	3B	
49	SU960 500	WHT			28	28	4	3B	63	-45	75	-27	B				WE	3B	
53	SU964 500	WHT			25	25	4	3B	84	-24	90	-12	B				WE	3B	
64	SU961 499	WHT	W	3	28	28	4	3B	64	-44	76	-26	B				WE	3B	
76	SU958 498	WHT					1	1	100	-8	120	18	A				DR	2	imp70seeP2
93	SU954 497	WHT			50		1	1	121	13	97	-5	2				DR	2	
99	SU960 497	WHT			30	30	4	3B	86	-22	92	-10	A				WE	3B	
114	SU952 496	WHT			25	52	3	2	96	-12	107	5	A				WD	2	ncalctopdeeper
120	SU956 496	WHT			35	35	4	3B	70	-38	81	-21	B				WE	3B	
124	SU962 496	WHT			28	28	4	3B	85	-21	91	-18	B				WE	3B	see pit1
129	SU969 496	WHT			28	28	4	3B	85	-21	91	-8	B				WE	3B	
136	SU951 495	CER			000	18	4	3B	74	-32	74	-25					WE	3B	
138	SU953 495	WHT	N	1	27	47	3	2	92	107	-16	5	A				WD	2	deeper
140	SU955 495	WHT			28	48	3	2	101	-7	113	11	A				WD	2	deeper
142	SU957 495	WHT					3	3A	74	-32	74	-25	B				WD	3A	ImpQDr
156	SU971 495	WHT			45		1	1	104	-2	116	17	A				DR	2	imp 70cm prob
159	SU974 495	WHT			28	40	4	3B	87	-19	93	-6	A				WE	3B	
162	SU951 495	WHT	N	1	000	22	4	3B	76	-30	76	-23	B				WE	3B	
169	SU958 494	WHT			25	25	4	3B	84	-22	90	-19	B				WE	3B	
170	SU959 494	WHT			30	60	3	3A	106	0	113	4	A				WE	3A	
172	SU961 494	WHT			30	30	4	3B	86	-20	92	-17	A				WE	3B	
179	SU968 494	WHT			30	30	4	3B	85	-21	91	-8	B				WE	3B	
181	SU970 494	CER	W	1	29	29	4	3B	91	-15	103	4					WE	3B	
183	SU972 494	WHT			30	50	3	2	98	-8	108	-1	A				WE	2	deeper
190	SU953 493	WHT	S	2	15	15	4	3B		0		0					WE	3B	
193	SU956 493	WHT			27	42	4	3A	91	-15	103	4	A				WE	3B	hor1 mc1
195	SU958 493	WHT			20	20	4	3B	81	-25	87	-22	B				WE	3B	
207	SU970 493	WHT					1	1	53	-53	53	-46	4				DR	3A	ix3 deeper
209	SU972 493	WHT					1	1	67	-39	67	-32	B				DR	3A	ix2 deeper
212	SU975 493	WHT					1	1	140	34	124	25	1					1	
213	SU952 492	WHT			43	43	3	3A		0		0					WE	3A	
215	SU954 492	WHT	N	1	43	43	3	3A	80	-26	87	-12	B				WD	3A	deeper
219	SU958 492	WHT			30	30	4	3B	86	-20	92	-17	A				WE	3B	
220	SU959 492	WHT					1	1	121	15	122	13	2					1	imp deeper
223	SU962 492	WHT			42	85	1	1	127	21	112	3	2				DR	2	imp deeper
229	SU968 492	WHT					1	1	52	-54	52	-47	4				DR	3A	ix2 deeper

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	--WETNESS-- GLEY	SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	DRT	M REL FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
237	SU953 491	WHT	N	1	40	40	3	3A	99	-7	104	5	A				WE	3A	
240	SU956 491	WHT	E	2	23	23	4	3B	82	-24	88	-11	B				WE	3B	
245	SU961 491	WHT					3	3A	141	43	114	25	1				WE	3A	
248	SU964 491	WHT	E	5			1	1	72	72	-26	-17	B				DR	3B	ICh40cm
251	SU967 491	WHT	E	4			1	1	85	-21	85	-14	B				DR	3A	1x2 deeper
256	SU972 491	WHT					1	1	52	-54	52	-47	4				DR	3A	1x3 deeper
258	SU953 490	BAR	E	1			1	1	128	22	104	5	2				DR	2	
271	SU966 490	WHT					1	1	76	-30	78	-21	B				DR	3B	hardshallowCh
275	SU970 490	WHT	N	4			1	1	79	-27	82	-17	B				WE	3B	1@30
278	SU953 489	BAR	N	2			1	1	77	-29	77	-22	B				DR	3A	
283	SU958 4895	BAR	N	4			1	1	118	20	108	19	2				DR	2	I90 G2tsst
288	SU963 489	WHT	N	3			1	1	57	-28	57	-19	B				DR	3B	ImpCh40
293	SU953 488	BAR	N	3			1	1	70	-28	72	-17	B				DR	3B	IMP 50
306	SU966 488	BAR	N	8			1	1	84	-14	89	0	A				GR	3B	I CH 50
325	SU958 486	BAR	N	8			1	1	65	-33	65	-24	B				DR	3B	ICH 40 RTS 28
Pit1	SU952 501	CFW			000	22	4	3B	80	-28	86	-16	B				WE	3B	
Pit2	SU954 496	WHT			38	62	3	2	153	47	117	8	2				WD	2	pit80 aug120
Pit3	SU966 4905	WHT	N	1			1	1	48	-58	58	-41	4				DR	3B	
Pit4	SU968 492	WHT					1	1	94	-12	94	-5	A				DR	3A	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
4	0-28	C	10YR42	000C00	F				0	0	HR	2						
	28-60	C	10YR53	000C00	M			Y	0	0		0			P		Y	
9	0-28	C	10YR42						0	0	HR	2						
	28-60	C	75YR53	000C00	M			Y	0	0		0			P		Y	
15	0-28	C	10YR42	000C00	C			Y	0	0	HR	2						
	28-60	C	75YR53	000C00	M			Y	0	0		0			P		Y	
20	0-20	HCL	10YR32						0	0	HR	2						
	20-60	C	10YR53	000C00	M			Y	0	0		0			P		Y	
27	0-30	MCL	10YR42	000C00	C			Y	0	0	HR	2						
	30-38	C	25Y 63	000C00	M			Y	0	0		0			M			
	38-60	C	10YR53	000C00	M			Y	0	0		0			P		Y	
38	0-30	HCL	10YR42						0	0	HR	2						
	30-60	C	25Y 63	000C00	C			Y	0	0		0			P		Y	
47	0-30	HCL	10YR42	000C00	F				0	0	HR	5						
	30-60	C	25Y 63	000C00	M			Y	0	0	HR	1			P		Y	
49	0-28	HCL	10YR42						0	0	HR	2						
	28 60	C	10YR53	000C00	C			Y	0	0	HR	1			P		Y	
53	0 25	MCL	10YR43						0	0	HR	2						
	25-60	C	25Y 63	000C00	M			Y	0	0		0			P		Y	
64	0 28	HCL	10YR42						0	0	HR	2						
	28-60	C	75YR53	000C00	C			Y	0	0		0			P		Y	
76	0-30	FSL	10YR42						0	0	HR	2						
	30-70	FSL	10YR54						0	0	HR	5			M			
93	0-28	MSL	10YR42						0	0	HR	2						
	28-50	SCL	10YR54						0	0	HR	1			M			
	50-70	MSL	25Y 63	000C00	C			Y	0	0	HR	2			M			
	70-100	SCL	25Y 63	000C00	C			Y	0	0	HR	2			M			
	100-120	LMS	10YR64	000C00	C			Y	0	0	HR	5			M			
99	0-30	MCL	10YR42	000C00	F				0	0	HR	2						
	30 60	C	10YF53	000C00	M			Y	0	0	HR	1			P		Y	
114	0-25	MCL	10YR42						0	0	HR	3						
	25-52	SCL	25Y 63	000C00	M			Y	0	0	CH	2			M			Y
	52-70	C	10YR53	000C00	M			Y	0	0	CH	1			P		Y	Y
120	0-35	MCL	10YR42						0	0	HR	2						
	35 60	C	25Y 63	000C00	M			Y	0	0	HR	2			P		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
124	0-28	HCL	10YR42	000C00	F				0	0	HR	2						
	28-60	C	05Y 63	000C00	M			Y	0	0		0			P		Y	
129	0-28	HCL	10YR43						0	0	HR	2						
	28-60	C	25Y 63	000C000	M			Y	0	0	HR	1			P		Y	
136	0-18	MCL	10YR41	10YR46	C			Y	0	0		0						
	18-50	C	10YR52	10YR56	C			Y	0	0		0			P		Y	
138	0-27	MSL	10YR43						0	0		0						N
	27-47	LMS	25Y 81	10YR56	C	D		Y	0	0	HR	2			M		N	N
	47-80	SC	05GY61	10YR56	M	D		Y	0	0		0			P		Y	N
140	0-28	FSL	10YR32						0	0	HR	2						
	28-48	FSL	10YR52	000C00	M			Y	0	0	HR	2			M			
	48-70	C	25Y 52	000C00	M			Y	0	0		0			P		Y	
142	0-30	MCL	10YR42						0	0		0						N
	30-45	HCL	25Y 54	10YR56	C			S	0	0	HR	20			M		N	N
156	0-32	FSL	10YR43						0	0	HR	2						
	32-45	HCL	10YR54						0	0	HR	2			M			
	45-70	HCL	10YR53	000C00	M			Y	0	0	HR	2			M			
159	0 28	MCL	10YR42						0	0	HR	2						
	28 40	SCL	10YR53	000C00	M			Y	0	0	HR	2			M			
	40 60	C	25Y 63	000C00	M			Y	0	0		0			P		Y	
162	0-22	MCL	10YR42	10YR46	C			Y	0	0	HR	1						N
	22-50	C	25Y 72	10YR66	M			Y	0	0		0			P		Y	N
169	0-25	HCL	10YR42						0	0	HR	2						
	25-60	C	10YR53	000C00	M			Y	0	0	CH	1			P		Y	
170	0-30	MCL	10YR42						0	0	HR	2						
	30-60	C	25Y 63	000C00	C			Y	0	0	HR	2			M			
	60-80	C	25Y 63	000C00	M			Y	0	0	HR	1			P		Y	
172	0-30	HCL	10YR42	000C00	F				0	0	HR	2						
	30-60	C	75YR53	000C00	C			Y	0	0	HR	1			P		Y	
179	0-30	HCL	10YR42						0	0	HR	2						
	30-60	C	10YR53	000C00	M			Y	0	0	CH	1			P		Y	
181	0-20	MCL	10YR42	10YR46	C			Y	0	0	HR	3						
	20-29	HCL	10YR43						0	0		0			M			
	29-70	C	10YR71	10YR58	M			Y	0	0		0			P		Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
183	0-30	FSL	10YR42						0	0	HR	2						
	30 50	SCL	10YR53	000C00	C			Y	0	0	HR	2		M				
	50-70	SCL	10YR53	000C00	C			Y	0	0	HR	1		P			Y	
190	0-15	HCL	25Y 53					N	0	0	HR	2					N	Y
	15-60	C	25Y 71	10YR58	M			Y	0	0	HR	2					Y	Y
193	0-27	SCL	10YR42						0	0	HR	2						N
	27-42	SCL	25Y 62	10YR56	C			Y	0	0	HR	5		M			N	Y
	42-70	C	25Y 62	25Y 66	M	D		Y	0	0		0		P			Y	N
195	0-20	MCL	10YR42	000C00	F				0	0	HR	2						
	20-60	C	10YR53	000C00	M			Y	0	0	HR	1		P			Y	
207	0-30	MCL	10YR43						0	0	HR	2						
209	0-28	FSL	10YR42						0	0	HR	2						
	28-40	SCL	10YR43						0	0	HR	5		M				
212	0 32	FSL	10YR42						0	0	HR	2						
	32 70	FSL	10YR43						0	0	HR	2		M				
	70-90	FSL	10YR54						0	0	HR	1		M				
213	0-27	MCL	10YR52						0	0	HR	1						N
	27 43	HCL	10YR54	10YR58	C			S	0	0	HR	1						N
	43-90	C	10YR61	10YR58	M			Y	0	0	HR	1					Y	N
215	0-25	SCL	10YR42						0	0	HR	2						Y
	25-43	SCL	25Y 64	25Y 66	C	D		S	0	0	HR	15		M				N
	43-65	C	10YR62	10YR56	M	D		Y	0	0	HR	25		P			Y	N
219	0-30	HCL	10YR42	000C00	F				0	0	HR	2						
	30 60	C	25Y 63	000C00	C			Y	0	0	HR	1		P			Y	
220	0 35	FSL	10YR42						0	0	HR	2						
	35-65	FSL	10YR43						0	0	HR	2		M				
	65-80	SCL	10YR54						0	0	HR	10		M				
223	0-30	FSL	10YR42						0	0	HR	2						
	30-42	SCL	10YR54	000C00	F				0	0	HR	2		M				
	42-55	SC	10YR53	000C00	C			Y	0	0	HR	2		M				
	55-70	SC	25Y 53	000C00	C			Y	0	0	HR	2		M				
	70-85	SC	25Y 53	000C00	M			Y	0	0	HR	2		M				
	85-100	C	25Y 63	000C00	M			Y	0	0		0		P			Y	
229	0-20	MZCL	10YR42						2	0	HR	4						
	20 30	HZCL	10YR54						0	0	HR	4		M				

SAMPLE	DEPTH	TEXTURE	COLOUR	--MOTTLES COL	ABUN	--- PED CONT	COL	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
237	0 23	MCL	10YR52						0	0	HR	2						Y
	23 40	HCL	10YR54	10YR56	F				0	0	HR	10		M				Y
	40-80	C	10YR72	10YR66	M	D		Y	0	0		0		P			Y	Y
240	0 23	HCL	10YR53						0	0	HR	5						Y
	23-60	C	05Y 72	10YR56	M	D		Y	0	0		0		P			Y	Y
245	0-28	MCL	10YR42						2	0	HR	5						
	28-38	HCL	25Y 54						0	0	HR	5		M				
	38-45	HCL	10YR53	10YR66	C				0	0	HR	2		M				
	45-65	MCL	10YR53						0	0		0		M				
	65-120	C	05Y 62	75YR58	M				0	0		0		M				
248	0-30	MZCL	25Y 53						2	0	HR	5						Y
	30-50	CH	10YR81						0	0	HR	5		P				Y
251	0-30	MZCL	10YR42						1	0	HR	4						
	30-50	HCL	10YR43						0	0	HR	4		M				
256	0-30	MCL	10YR42						0	0	CH	2						
258	0-27	MSL	10YR43						0	0	HR	2						N
	27-45	MSL	10YR54						0	0	HR	10		M				N
	45-57	C	75YR54	10YR46	C	D		S	0	0	HR	2		M			N	N
	57-120	MZCL	10YR64						0	0	HR	30		M				Y
271	0-28	MZCL	10YR52						6	0	HR	2						
	28-58	CH	00XX00						0	0	HR	2		P				
275	0-25	MZCL	10YR42						2	0	HR	4						
	25-30	HZCL	10YR54						0	0	CH	20		M				
	30-60	CH	00XX00						0	0		0		P				
278	0-28	MCL	10YR43						0	0	HR	6						Y
	28-50	SCL	75YR46						0	0	HR	10		M				Y
283	0 30	MSZL	10YR42						9	3	HR	15						Y
	30 60	MCL	10YR43						0	0	HR	8		M				N
	60-70	SCL	10YR44						0	0	HR	5		M				N
	70-90	MSL	10YR44						0	0	HR	8		M				N
288	0-30	MZCL	10YR42						6	4	HR	10						Y
	30-50	CH	10YR81						0	0	HR	5		P				Y
293	0-25	MCL	10YR43						6	0	HR	10						Y
	25-35	MCL	10YR54						0	0	HR	20		M				Y
	35-55	CH	10YR81						0	0	HR	5		P				Y

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
306	0-30	MZCL	10YR53						6	4	HR	10						Y
	30-45	MZCL	25Y63						0	0	HR	10			M			Y
	45-65	CH	10YR81						0	0	HR	5			P			Y
325	0-28	MZCL	25Y 62						2	0	HR	5						Y
	28-48	CH	10YR81						0	0	HR	5			P			Y
Pit1	0-22	C	10YR53	10YF56	C			Y	1	0	HR	3						N
	22-60	C	10YR52	10YR56	M		10YR53	Y	0	0		0	STCAB	VM	P	Y	Y	N
Pit2	0-22	FSL	10YR32						1	0	HR	3						N
	22-38	FSL	10YR53						0	0	HR	5	MCSAB	FR	M			Y
	38-62	FSL	25Y 62	75YR56	M			Y	0	0	HR	5	WCSAB	VF	M			Y
	62-95	SC	05Y 63	75YR56	M			Y	0	0		0	MCP	FM	P		Y	Y
	95-120	SCL	10YR53	75YR56	M			Y	0	0		0			M		N	N
Pit3	0-29	MZCL	10YR52						6	1	HR	6						
	29-65	CH	00XX00						0	0		0			P			
Pit4	0-22	MCL	10YR42						9	5	HR	14						
	22-42	SCL	10YR56						0	0	HR	15			M			
	42-58	MZCL	10YR52						0	0	HR	15			M			
	58-83	CH	00XX00						0	0	HR	15			P			