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AYLESBURY VALE DISTRICT LOCAL PLAN
Land to the East and South of Haddenham
Buckinghamshire

Agricultural Land Classification
ALC Map and Report

March 1999

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

AYLESBURY VALE DISTRICT LOCAL PLAN
LAND TO THE EAST AND SOUTH OF HADDENHAM

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of 87 hectares of land to the east and south of Haddenham, in Buckinghamshire. The survey was carried out during March 1999.

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). The survey was carried out in connection with MAFF's statutory input to the Aylesbury Vale District 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 agricultural land on this site was mostly in grassland with some cereal production in the north. The areas mapped as 'Other land' include farm buildings and trackways, an animal hospital and the extension of a garden centre.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:15,000. 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	15.6	19.7	18.1
3a	55.3	69.7	64.0
3b	8.4	10.6	9.7
Other land	7.1	N/A	8.2
Total surveyed area	79.3	100	91.8
Total site area	86.4	-	100

7. The fieldwork was conducted at an average density of approximately 1 boring every 2 hectares of agricultural land. In total, 49 borings and 5 soil pits were described.

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

8. The agricultural land on this site has been classified as Grade 2 (very good quality), Subgrade 3a (good quality) and Subgrade 3b (moderate quality). The principal limitations to land quality include soil droughtiness and/or soil wetness with soil workability in places.

9. Grade 2 land is located on the higher ground, in the north of the site. Soils are typically calcareous and well drained with clayey topsoils overlying similarly textured slightly stony subsoils. This combination of soil properties, particularly the heavy topsoils, interacts with the local climate to produce a combined minor soil droughtiness and wetness limitation.

10. Subgrade 3a land is variable and occupies most of the site. The majority of this land suffers from a soil droughtiness limitation with clayey topsoils overlying stony clay subsoils. The effect of a droughtiness limitation such as this may be to cause a reduction in crop yield and limit the flexibility of the land, particularly in drier years. Elsewhere, soil wetness is also a limitation where clayey topsoils overly poorly draining clay subsoils. The effect of a soil wetness limitation will affect the range and yield of crops that can be grown as well as restricting the number of days when the land is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

11. Subgrade 3b land is located in the south-west of the site and is limited by soil droughtiness due to the underlying limestone. Soils are typically calcareous throughout with slightly stony heavy clay loam topsoils. These overly similarly textured subsoils, which become stonier with depth passing to solid limestone. This combination of soil factors, in the prevailing climate, results in a moderate soil droughtiness limitation.

FACTORS INFLUENCING ALC GRADE

Climate

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

13. 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).

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SP 748 088	SP 745 103
Altitude	m, AOD	75	90
Accumulated Temperature	day°C (Jan-June)	1421	1404
Average Annual Rainfall	mm	621	631
Field Capacity Days	days	131	132
Moisture Deficit, Wheat	mm	110	108
Moisture Deficit, Potatoes	mm	102	99
Overall climatic grade	N/A	Grade 1	Grade 1

14. 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.

15. 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.

16. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk do not affect land quality at this location. The site is climatically Grade 1. However, climatic factors do interact with soil properties to influence soil wetness and soil droughtiness. At this locality the climate is relatively dry in regional terms. The likelihood of soil droughtiness problems may therefore be enhanced.

Site

17. The site lies at altitudes in the range 70–90 m AOD. The highest land occurs in the extreme north of the site, along the Aylesbury Road. From this point the land falls gently southwards with the southern boundary marking the lowest lying land. Nowhere on the site do gradient, microrelief or flooding affect land quality.

Geology and soils

18. The most detailed published geological information for the site (BGS, 1993) shows most of it to be underlain by non-marine limestone, marl and clay of the Purbeck Formation, with sands and limestones of the Portland Formation, located in the south and south east.

19. The most detailed published soils information covering the area (SSEW, 1983) shows it to comprise two soil associations. In the north and south, soil of the Moreton association is mapped. These are described as 'well drained calcareous clayey and fine loamy soils over limestone, in places shallow and brashy. Some deeper slowly permeable calcareous clayey soils' (SSEW, 1983). Over the central area of the site, soil of the Evesham 2 association is shown. This is described as 'slowly permeable calcareous clayey soils. Some slowly permeable seasonally waterlogged non-calcareous clayey and fine loamy or fine silty over clayey soils. Landslips and irregular terrain' (SSEW, 1983).

AGRICULTURAL LAND CLASSIFICATION

20. 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.

21. 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

22. Grade 2 land is mapped in the north of the site and suffers from a combined soil workability/wetness and soil droughtiness limitation.

23. Very good quality land is well drained (Wetness Class I) and comprises calcareous clay or heavy clay loam topsoils which may contain up to 10% total hard limestone by volume (0–4% > 2cm in size). These overlie clay upper subsoils which may contain up to 10% total limestone or up to 35% total soft limestone. These pass to similarly textured stony clay lower subsoils some of which are impenetrable to the auger between 70–85 cm. Pit 2 (see Appendix II) is typical of the well drained (wetness class I) soils, variants of these soils which have large 'flaggy' limestone at a depth between 60–75cm at which point they become impenetrable. Beneath this lies a gleyed sandy clay loam to depth. In the absence of this impenetrable layer, clayey subsoils with up to 25% soft limestone is observed to depth. In these profiles the clays may be gleyed, typically below 40cm and slowly permeable at varying depths below this. Pit 1 (see Appendix II) confirmed the existence of these poorly structured clayey horizons, which assign these soils to Wetness Class II. This combination of soil wetness class and heavy calcareous topsoil textures, interacts with the local climate (131 FC days) to give a classification of Grade 2. Moisture balance calculations also indicate Grade 2 is appropriate for these soils. A combined soil workability/wetness and soil droughtiness limitation may influence the choice of crops grown and the level and consistency of yields.

Subgrade 3a

24. Good quality agricultural land has been mapped over most of the site. Soil droughtiness is the principal limitation with soil wetness and soil workability to a lesser extent.

25. Land restricted by a slight soil droughtiness limitation is characterised by well drained (Wetness Class I) soils which are typically impenetrable to the soil auger from 48cm due to limestone in the soil matrix. These soils comprise calcareous heavy clay loam or clay topsoils, which may contain up to 7% total hard limestone (by volume). These overlie clay upper subsoils with up to 5% hard rock. Pit 4 (see Appendix II) is representative of these soils, and was dug to investigate the nature of the impenetrable layer and its rootability. The pit confirmed the impenetrable layer to be a mixture of soft limestone and hard rock, which restricted rooting to a depth of 75cm. These soil characteristics, interacting with the local climate, effectively limit the amount of available water to a growing plant. This is confirmed by moisture balance calculations which indicate that Subgrade 3a is appropriate. These slightly droughty soils may reduce the level and consistency of yields.

26. There are a number of isolated auger borings which are restricted by either a soil wetness or soil workability limitation. Soil wetness is typical of pit 3 and pit 5 (see Appendix II). Soils comprise calcareous heavy clay loam topsoils which contain a few (< 2% total) hard rock or soft limestone. These pass to porous calcareous clayey subsoils which are slowly permeable, from 50–60cm, in the auger borings and at similar depths in the two pits. Pit 3 and 5, confirmed the existence of these poorly structured clayey layers which act to restrict the downward movement of water. These factors, combined with the calcareous topsoil textures, result in land classified Subgrade 3a. A slight soil wetness limitation may adversely affect crop growth and development, as well as limiting the flexibility of the land due to a reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock. In places, better drained soils (WCII) are placed in this mapping unit; these are limited by having heavier (calcareous clay) topsoils.

Subgrade 3b

27. Moderate quality land is located on gently sloping ground along the south-west boundary. Soil droughtiness is the principal limitation of these well drained (WCI) soils.

28. These soils are typically calcareous heavy clay loam topsoils with up to 8% total hard rock by volume or 5% soft limestone. These pass to clay upper subsoils with up to 31% total hard limestone or up to 20% soft limestone . From 40+cm, these soils are impenetrable to the auger over limestone bedrock. Pit 4 (see Appendix II) is typical of these soils and confirmed the existence of these stonier layers. In the pit, a clay lower subsoil with 46% hard limestone (by volume) is recorded passing to solid limestone at 48cm. Rooting in this pit was observed down to 75cm. Moisture balance calculations which take account of these soil characterises, and the interaction with the local climate, indicate that Subgrade 3b is appropriate. If rooting extended to 120 cm this would not affect the final grade. Soil droughtiness may reduce the level and consistency of yield.

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SOURCES OF REFERENCE

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

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South-East England, 1:250,000.*
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	DRT	M.REL FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP74401020	CER					1	2	80	-30	90	-12	3B				WD	2	IMP70/SEE2P
3	SP74601020	CER	S	1			1	2	139	29	106	4	2				WD	2	SEE2P
4	SP74501010	CER					1	2	94	-16	103	1	3A				WD	2	IMP75/AT2P
7	SP74401000	CER			35	75	2	3A	119	9	95	-7	2				WE	3A	SPL/SEE1P
9	SP74601000	CER					1	3A	102	-8	107	5	3A				WK	3A	NON-CALC TS
10	SP74300990	CER			32	32	3	3B	128	18	105	3	2				WE	3B	BORDER WCIV
12	SP74500990	CER			60	82	2	2	116	6	110	8	2				WE	2	IMP98/SEE1P
14	SP74700990	CER	S	1	75		1	2	108	-2	114	12	3A				WD	2	IMP85/SEE2P
16	SP74400980	CER			28	38	3	3A	92	-18	103	1	3A				WD	3A	SPL/SEE1P
18	SP74600980	CER	E	1	32	65	2	3A	121	11	99	-3	2				WE	3A	SPL/SEE1P
21	SP74500970	WHT					1	2	94	-16	105	3	3A				WD	2	IMP75/SEE2P
23	SP74600960	WHT			35	35	3	3A	82	-28	91	-11	3B				WD	3A	SPL/SEE5P
24	SP74400960	WHT	W	2			1	2	79	-31	79	-23	3B				DR	3A	IMP48/2P-18/96
26	SP74700970	WHT					1	2	58	-52	58	-44	4				DR	3B	IMP37/2P-18/96
29	SP74500950	PGR			21	31	4	3B	109	-1	104	2	3A				WE	3B	
32	SP74600940	PGR			40		1	2	77	-33	77	-25	3B				DR	3A	IMP48/2P-18/96
33	SP74500930	PGR			50	50	2	3A	119	9	101	-1	2				WE	3A	
36	SP74600920	PGR			45		1	2	81	-29	84	-18	3B				DR	3A	IMP55/2P-18/96
38	SP74600910	PGR			50		1	2	106	-4	108	6	3A				WD	2	IMP87/2P-18/96
41	SP74900910	PGR			0	55	3	3A	95	-15	96	-6	3A				WE	3A	SEE5P
44	SP74800900	PGR			55	55	2	3A	109	-1	105	3	3A				WD	3A	IMP95/SEE4P
46	SP75000900	PGR					1	2	93	-17	107	5	3A				WD	2	IMP70CM
48	SP74900890	PGR			65		1	2	147	37	111	9	2				WD	2	VWET65+/19/96
50	SP75100890	PGR			25		2	3A	98	-12	106	4	3A				WE	3A	SEE3P-19/96
51	SP74800880	PGR			25	25	4	3B	95	-15	100	-2	3A				WE	3B	SEE5P
53	SP75000880	PGR			18	48	2	2	129	19	108	6	2				WE	3A	SEE1P-19/96
55	SP74900870	PGR	E	1			1	2	74	-36	74	-28	3B				DR	3A	SEE3P-19/96
56	SP74800860	PGR			25	25	4	3B	95	-15	96	-6	3A				WE	3B	SEE5P
58	SP75000860	PGR			0	20	4	3B	79	-31	82	-20	3B				WE	3B	SEE3P
59	SP74900850	OTH			49	49	2	2	88	-22	98	-4	3B				DR	3A	FOOTING
59A	SP74900850	OTH			48	48	2	2	74	-36	74	-28	3B				DR	3A	FOOTING
63	SP74900840	MAZ			30		2	2	106	-4	107	5	3A				WD	2	SEE2P-19/96
65	SP74900830	PGR			48		1	2	98	-12	104	2	3A				WD	2	SEE2P-19/96
66	SP75000820	PGR			42	42	3	3A	90	-20	96	-6	3A				WE	3A	SPL/SEE5P
68	SP74700810	PGR			30		2	2	87	-23	91	-11	3B				DR	3A	SEE2P-19/96
70	SP74900810	PGR					1	2	64	-46	64	-38	3B				DR	3A	IMP43CM
72	SP74400800	PGR			35		2	2	74	-36	77	-25	3B				DR	3B	AT 4P
74	SP74600800	PGR					1	2	82	-28	83	-19	3B				DR	3A	SEE3P-19/96
76	SP74800800	PGR			50		1	2	80	-30	81	-21	3B				DR	3A	SEE3P-19/96
77	SP73900790	PGR			50		1	2	123	13	117	15	2				DR	2	ALSO WK
77A	SP73720803	RGR					1	2	76	-34	78	-24	3B				DR	3B	IMP55/SEE4P
78	SP74000790	PGR	SW	1			1	2	95	-15	105	3	3A				DR	3A	IMP65/SEE4P

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
80	SP74300790	PGR			55		1	2	81	-29	85	-17	3B				DR	3B	IMP80/SEE4P
82	SP74500790	PGR	S	1	60		1	2	111	1	106	4	3A				DR	3A	IMP100/SEE4P
84	SP74000780	RGR			50		1	1	90	-20	97	-5	3A				DR	3A	IMP60/SEE4P
86	SP74200780	PGR	SE	2			1	1	65	-45	65	-37	3B				DR	3B	IMP40/SEE4P
87	SP74300780	PGR	SE	1			1	2	76	-34	77	-25	3B				DR	3B	IMP50/SEE4P
88	SP74400780	PGR	S	1	75		1	2	118	8	107	5	2				WD	2	SEE4P
89	SP74200770	PGR	S	1	43		1	2	71	-39	71	-31	3B				DR	3B	IMP48/SEE4P
1P	SP74401000	CER			43	60	2	2	129	19	107	5	2				WD	2	P75-A120/AB4
2P	SP74501010	CER			75		1	2	138	28	105	3	2				WD	2	P90-A120/AB7
3P	SP74850900	PGR			0	60	3	3A	103	-7	109	7	3A				WE	3A	AT AB45
4P	SP74400800	LEY	S	1			1	2	79	-31	83	-19	3B				DR	3B	P75IMP LMST
5P	SP74400910	PGR			20	55	3	3A	76	-34	79	-23	3B				WE	3A	AT AB41

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
1	0-30	C	10YR43						1	0	HR	8						Y	
	30-65	C	10YR6466						0	0	SLST	35		M				Y	
	65-70	C	10YR6466						0	0	HR	30		M				Y	
3	0-30	C	10YR32						0	0	HR	5						Y	
	30-45	C	10YR33						0	0	HR	3		M				Y	
	45-55	HCL	10YR44						0	0	HR	10		M					
	55-120	SCL	10YR54	10YR58	C	D		S	0	0	HR	15		M					
4	0-30	C	10YR42						0	0	HR	3						Y	SEE 2P
	30-45	C	10YR44						0	0	HR	5		M				Y	
	45-75	C	10YR6466						0	0	HR	5		M				Y	
7	0-30	C	10YR42						1	0	HR	5						Y	
	30-35	C	10YR54						0	0	HR	5		M				Y	
	35-75	C	25Y 6361	10YR66	C	D		Y	0	0	SLST	15		M				Y	
	75-120	C	05Y 41	10YR56	C	D		Y	0	0	HR	2		M				Y	
9	0-30	C	10YR42						0	0	HR	5							NON-CALC
	30-75	C	10YR54	10YR66	F	F			0	0	HR	10		M				Y	
	75-85	C	25Y 6373						0	0	SLST	30		M				Y	
10	0-32	HCL	25Y 42						0	0	HR	3							
	32-70	C	25Y 53	10YR5658	M	D		Y	0	0		0		P		Y			
	70-120	C	25Y 61	10Y5658	M	D		Y	0	0		0		P		Y			
12	0-35	HCL	10YR4243						0	0	HR	5						Y	
	35-60	C	25Y 5453						0	0	SLST	15		M				Y	
	60-82	C	25Y 5361	10YR4656	C	D		Y	0	0	SLST	10		M				Y	
	82-98	C	25Y 6171	10YR5658	C	D		Y	0	0		0		P		Y		Y	
14	0-30	C	10YR4243						0	0	HR	3						Y	
	30-75	C	10YR4454						0	0		0						Y	
	75-85	C	25Y 6163	10YR4656	C	D		Y	0	0	SLST	15						Y	
16	0-28	HCL	10YR4243						0	0	HR	5						Y	
	28-38	C	10YR53	10YR46	C	D		Y	0	0		0		M				Y	
	38-70	C	25Y 5372	10YR26	C	D		Y	0	0	SLST	10		P		Y		Y	
18	0-32	C	10YR4243						0	0	HR	3						Y	
	32-45	C	10YR4353	10YR46	C	D		Y	0	0	HR	5		M				Y	
	45-65	C	10YR4353						0	0	SLST	50		M				Y	
	65-120	C	10YR53	10YR5658	C	D		Y	0	0	HR	5		P		Y		Y	
21	0-24	HCL	10YR43						4	0	HR	10						Y	
	24-38	C	10YR44	10YR54	C	D		N	0	0	HR	10		M				Y	
	38-75	C	25Y 7374						0	0	SLST	15		M				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	
23	0-28	C	25Y 42						5	0	HR	1						Y	
	28-35	C	25Y 53						0	0	HR	2		M				Y	
	35-58	C	25Y 53	10YR58	M	D		Y	0	0	HR	2		P			Y	Y	
	58-65	C	25Y 63						0	0	HR	15		M				Y	
24	0-29	HCL	10YR43						2	0	HR	5						Y	
	29-48	C	10YR54						0	0	HR	5		M				Y	
26	0-28	C	25Y 42						2	0	HR	7						Y	
	28-37	C	25Y 53						0	0	HR	5		M				Y	
28	0-28	HCL	25Y 42						0	0	HR	2						Y	
	28-50	C	25Y 43	10YR56	F	D			0	0	HR	2		M				Y	
	50-87	C	25Y 5361	10YR56	C	D		Y	0	0	SLST	30		M					
29	0-21	HCL	10YR42						0	0		0						Y	
	21-31	C	25Y 53	25Y66	C	D		Y	0	0		0		M				Y	
	31-66	C	25Y 63	10YR68	M	D		Y	0	0		0		P		Y			
	66-95	C	10GY51	10YR56	M	D		Y	0	0	HR	5		P		Y			
32	0-25	HCL	10YR42						0	0	HR	2						Y	
	25-40	C	10YR4344						0	0	HR	3		M				Y	
	40-48	C	25Y 5362	10YR4656	C	D		Y	0	0	SLST	30		M				Y	
33	0-20	C	10YR4232						0	0	HR	3						Y	
	20-50	C	25Y 43						0	0	HR	2		M				Y	
	50-60	C	05Y 5153	10YR56	C	D		Y	0	0	SLST	15		P		Y		Y	
	60-120	C	25Y 5361	10YR4656	C	D		Y	0	0	SLST	30		P		Y		Y	
36	0-25	C	25Y 42						0	0	HR	2						Y	
	25-45	C	25Y 43						0	0	HR	5		M				Y	
	45-55	C	25Y 5361	10YR4656	C	D		Y	0	0	SLST	30		M				Y	
38	0-28	HCL	25Y 42						0	0	HR	2						Y	
	28-50	C	25Y 43	10YR56	F	D			0	0	HR	2		M				Y	
	50-87	C	25Y 5361	10YR56 58	C	D		Y	0	0	SLST	30		M				Y	
41	0-20	HCL	10YR4232	10YR46	C	D		Y	0	0	HR	2						Y	
	20-55	C	25Y 53	10YR5658	M	D		Y	0	0	HR	5		M				Y	
	55-78	C	10YR5352	10YR5658	C	D		Y	0	0	HR	5		P		Y		Y	
44	0-23	C	10YR4232						0	0	SLST	2						Y	
	23-55	C	10YR53						0	0	HR	5		M				Y	
	55-85	C	25Y 5152	10YR56	C	D		Y	0	0	SLST	5		P		Y		Y	
	85-95	C	25Y 6162	10YR56	C	D		Y	0	0	SLST	30		P		Y		Y	
46	0-25	HCL	10YR43						0	0	HR	5						Y	
	25-60	C	10YR4454						0	0	HR	10		M				Y	
	60-70	C	10YR64						0	0	HR	10		M				Y	+10% SLST

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	
48	0-22	HCL	10YR42						0	0	HR	2							
	22-30	C	10YR54						0	0	HR	10		M				Y	
	30-65	C	10YR5464						0	0	HR	5		M				Y	
	65-120	SCL	25Y 7371	10YR68	C	D		Y	0	0		0		M					
50	0-25	C	25Y 52	10YR46	F	D			0	0	HR	2						Y	
	25-40	C	10YR5354	10YR56	C	D		Y	0	0	HR	5		M				Y	
	40-60	C	25Y 6162	10YR58	C	D		Y	0	0	HR	5		M				Y	
	60-80	C	25Y 82	10YR78	C	D		Y	0	0	SLST	30		M				Y	IMP 80CM NOT SPL
51	0-25	C	25Y 42	10YR46	F	D			0	0	HR	2							
	25-40	C	25Y 53	10YR56	C	D		Y	0	0	HR	2		P		Y			
	40-80	C	25Y 63	10YR68	M	D		Y	0	0		0		P		Y			
53	0-18	MZCL	10YR41						0	0	HR	2						Y	
	18-48	C	25Y 63	10YR56	C	D		Y	0	0	HR	10		M				Y	
	48-80	C	25Y 61	10YR66	C	D		Y	0	0	SLST	20		M				Y	NOT SPL STONEY
	80-120	C	25Y 51	10YR56	C	F		Y	0	0	SLST	20		M				Y	NOT SPL STONEY
55	0-18	HCL	10YR42						0	0	HR	5						Y	
	18-38	C	25Y 64						0	0	HR	5		M				Y	
	38-75	SLST	10YR81	10YR68	C	D		Y	0	0		0		P				Y	IMP 75CM
56	0-25	HCL	10YR42						0	0	HR	5						Y	
	25-70	C	25Y 53	10YR68	M	D		Y	0	0	HR	10		P		Y			
	70-84	C	25Y 53	10YR68	M	D		Y	0	0		0		P		Y			IMP 84CM
58	0-20	HCL	10YR42	10YR46	C	D		Y	0	0		0						Y	
	20-55	C	05Y 52	10YR56	M	D		Y	0	0		0		P		Y		Y	
59	0-21	HCL	10YR43						0	0	HR	3						Y	
	21-39	C	10YR54						0	0	HR	5		M				Y	+5% SLST
	39-49	C	25Y 64						0	0	SLST	30		M				Y	
	49-70	C	05Y 52	10YR56	M	D		Y	0	0	SLST	15		P		Y		Y	
59A	0-22	HCL	10YR42						0	0	HR	3						Y	
	22-48	C	10YR44						0	0	HR	5		M				Y	
	48-68	C	25Y 53	10YR56	C	F		Y	0	0	HR	5		P		Y		Y	+5% SLST
63	0-30	HCL	10YR43						0	0	HR	3						Y	
	30-78	C	25Y 64	10YR56	C	D		Y	0	0	SLST	20		M				Y	NOT SPL STONEY
	78-90	C	25Y 64	10YR56	M	D		Y	0	0	SLST	25		M				Y	NOT SPL STONEY
65	0-25	C	10YR42						0	0	HR	5						Y	
	25-38	C	10YR5354						0	0	HR	3		M				Y	
	38-48	C	10YR5354	10YR58	F	D			0	0	HR	5		P				Y	NOT SPL <15CM
	48-80	C	10YR5354	10YR58	C	D		Y	0	0	SLST	20		M				Y	NOT SPL STONEY

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	
66	0-25	HCL	10YR43						0	0		0						Y	
	25-42	C	10YR54						0	0		0		M				Y	
	42-60	C	25Y 53	10YR58	C	D		Y	0	0		0		P			Y	Y	
68	0-30	HCL	10YR42						0	0	HR	3						Y	
	30-55	C	10YR53	10YR4656	C	D		Y	0	0	SLST	2		M				Y	+3% HR
70	0-22	C	10YR42						0	0	HR	5						Y	
	22-43	C	10YR4443						0	0	SLST	20		M				Y	
72	0-28	HCL	10YR42						0	0	HR	5						Y	
	28-35	C	10YR4454						0	0	HR	10		M				Y	
	35-60	C	10YR6473	10YR68	C	D		Y	0	0	HR	25		M				Y	
74	0-28	HCL	10YR4353						0	0	HR	5						Y	
	28-35	HCL	10YR54						0	0	HR	5		M				Y	
	35-50	HZCL	10YR64						0	0	SLST	20		M				Y	
	50-62	SLST	10YR72	10YR68	F	D			0	0	HR	5		P				Y	
76	0-28	HCL	10YR42						0	0	HR	3						Y	
	28-35	C	10YR44						0	0	HR	5		M				Y	
	35-50	C	10YR54						0	0	SLST	30		M				Y	
	50-72	SLST	10YR72	10YR68	C	D		Y	0	0		0		M				Y	
77	0-30	HCL	10YR42						0	0	HR	2						Y	
	30-50	C	10YR4344						0	0	HR	2		M				Y	
	50-90	HZCL	25Y 63	10YR56	C	D		Y	0	0	SLST	2		M				Y	IMP 90CM
77A	0-20	HCL	10YR3242						0	0	SLST	5						Y	+2% HR
	20-40	C	10YR4353						0	0	HR	5		M				Y	+5% SLST
	40-55	HCL	10YR53						0	0	SLST	50		M				Y	
78	0-20	C	10YR42						0	0		0						Y	
	20-50	C	10YR54	10YR56	F	F			0	0	SLST	5		M				Y	
	50-65	MZCL	10YR41						0	0	SLST	5		M				Y	
	65-66	SLST	25Y 72						0	0	HR	20		P				Y	
80	0-27	HCL	10YR4142						0	0	HR	8						Y	
	27-35	C	10YR44						0	0	HR	15		M				Y	
	35-55	HZCL	10YR5464						0	0	SLST	40		M				Y	
	55-75	ZC	10YR8164	10YR68	C	D		Y	0	0	SLST	50		M				Y	
82	0-30	HCL	10YR42						0	0	HR	5						Y	
	30-60	HCL	10YR54						0	0	HR	5		M				Y	
	60-95	HZCL	10YR6463	10YR68	C	D		Y	0	0	SLST	50		M				Y	
	95-100	SLST	10YR72						0	0	HR	10		P				Y	
84	0-30	MCL	10YR32						0	0	SLST	2						Y	
	30-50	HCL	10YR5354	10YR46	F	D			0	0	SLST	20		M				Y	
	50-60	HZCL	25Y 72	10YR4656	C	D		Y	0	0	HR	5		M				Y	IMP 60CM L/ST

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	IMP	SPL	CALC	
86	0-28	MCL	10YR42						0	0	SLST	5						Y	
	28-40	C	10YR43						0	0	SLST	20			M			Y	
87	0-25	MCL	10YR3242						0	0	HR	3						Y	
	25-37	C	10YR4344						0	0	HR	5			M			Y	+2% SLST
	37-52	MCL	10YR72						0	0	SLST	50			M			Y	
88	0-28	MCL	10YR42						0	0	HR	5						Y	
	28-50	C	10YR4454						0	0	HR	5			M			Y	
	50-75	MCL	10YR41						0	0	HR	5			M			Y	
	75-105	SLST	25Y 73	10YR68	C	D		Y	0	0	SLST	70			M			Y	
	105-120	SLST	05Y 82	10YR68	C	D		Y	0	0	HR	5			P			Y	
89	0-25	MCL	10YR42						0	0	HR	5						Y	
	25-43	C	10YR4344						0	0	HR	5			M			Y	
	43-48	HZCL	10YR72	10YR56	C	D		Y	0	0	SLST	30			M			Y	
1P	0-30	MCL	25Y 53						0	0	HR	3						Y	
	30-43	C	25Y 54						0	0	HR	3	MDCSAB	FR	M			Y	
	43-60	C	05Y 7263	10YR66	C	D		Y	0	0	SLST	25	MDCSAB	FR	M			Y	
	60-120	C	05Y 52	10YR5658	M	D	05Y 4151	Y	0	0		0	MDCAB	FM	P		Y	Y	
2P	0-29	C	10YR42						0	0	HR	5						Y	
	29-46	C	10YR43						0	0	HR	5	MDCSAB	FR	M			Y	
	46-60	C	10YR4454						0	0	HR	12	MDCSAB	FR	M			Y	
	60-75	C	25Y 64						0	0	HR	15	WKCSAB	FR	M			Y	
	75-120	SCL	05Y 63	10YR5868	C	D		Y	0	0	HR	5		FR	M				
3P	0-21	MCL	10YR42	10YR56	C	D		Y	0	0	HR	2						Y	
	21-44	C	25Y 53	75YR56	M	D		Y	0	0	SLST	5	MDCSAB	FR	M			Y	
	44-60	C	25Y6162	10YR56	C	D		Y	0	0	SLST	10	MDCSAB	FR	M			Y	
	60-80	C	05Y 52	10YR56	C	F		Y	0	0		0	MASSVE	VF	P		Y	Y	
4P	0-24	MCL	10YR42						2	0	HR	5						Y	
	24-32	MCL	10YR44						0	0	HR	31			M			Y	WET SIEVED
	32-48	C	10YR4454						0	0	HR	46			M			Y	WET SIEVED
	48-75	HZCL	10YR73	10YR68	C	D			0	0	HR	30			M			Y	WET SIEVED
5P	0-20	MCL	10YR42						0	0	HR	5						Y	
	20-55	C	25Y 53	10YR56	M	D		Y	0	0	HR	2	MDCSAB	FR	M			Y	POROUS
	55-70	C	05Y 52	10YR56	C	F		Y	0	0		0	MASSVE	VF	P		Y	Y	