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WEST OXFORDSHIRE DISTRICT LOCAL PLAN
Land between Ducklington and Curbridge
Oxfordshire

Agricultural Land Classification
ALC Map and Report

December 1998

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

WEST OXFORDSHIRE DISTRICT LOCAL PLAN
LAND BETWEEN DUCKLINGTON AND CURBRIDGE, OXFORDSHIRE

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of approximately 110 hectares of land between Ducklington and Curbridge, in Oxfordshire. The survey was carried out during December 1998.

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 West Oxfordshire 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 use on the site included stubble turnips grazed by sheep, permanent grassland and oilseed rape. The areas mapped as 'Other land' include woodland, drainage ditches, a disused railway track and an abattoir. A small area of agricultural land (1.4 hectares), in the extreme north-west of the site, was not surveyed as permission for access was not forthcoming.

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
3a	8.0	8.0	7.2
3b	92.0	92.0	83.9
Agricultural land not surveyed	1.4	N/A	1.3
Other land	8.3	N/A	7.6
Total surveyed area	100.0	100	91.1
Total site area	109.7	-	100

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

7. The fieldwork was conducted at an average density of 1.6 borings per hectare of agricultural land. In total, 67 borings and 4 soil pits were described.

8. The majority of the agricultural land at this site has been classified as Subgrade 3b (moderate quality) with a smaller area of Subgrade 3a (good quality). The principal limitations to land quality are soil wetness, with soil droughtiness along the northern boundary.

9. Land of good quality (Subgrade 3a) is coincident with the area underlain by river gravel geology. Here, soils are variably calcareous with fine loamy topsoils, overlying stony clayey subsoils, which pass to more gravely horizons at variable depths. This combination of soil properties interacting with the local climate limits the amount of available water for crops and produces a soil droughtiness limitation. The latter manifests itself in adversely affecting the level and consistency of yields, particularly in drier years.

10. Moderate quality land (Subgrade 3b) covers most of the site and occurs in conjunction with the underlying Oxford Clay. Soils comprise non-calcareous clay or fine loamy topsoils, which pass to less permeable clay subsoils which impede the movement of water through the profile. As these poorly draining clay horizons occur at shallow depths the land experiences a significant soil wetness limitation and is restricted to Subgrade 3b. Soils with drainage characteristics such as these will experience a restriction to the range of crops that can tolerate such wet conditions. The flexibility of the land is also affected as there will be a reduction in the number of days when the land is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock without the risk of damage to the soil.

FACTORS INFLUENCING ALC GRADE

Climate

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

12. 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 343 083	SP 3547 080
Altitude	m, AOD	80	85
Accumulated Temperature	day°C (Jan-June)	1425	1419
Average Annual Rainfall	mm	704	707
Field Capacity Days	days	154	155
Moisture Deficit, Wheat	mm	103	103
Moisture Deficit, Potatoes	mm	94	94
Overall climatic grade	N/A	Grade 1	Grade 1

13. 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.

14. 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.

15. 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.

Site

16. The site lies at altitudes in the range 80–87 m AOD. It is not affected by any site restrictions, such as gradient, microrelief or flooding.

Geology and soils

17. The most detailed published geological information for the site (BGS, 1982) maps most of it as Oxford Clay with the remainder comprising alluvium and patches of First and Third Terrace Deposits.

18. The most detailed published soils information covering the area (SSEW, 1983) shows most of it as soils of the Denchford association. These soils are described as 'slowly permeable seasonally waterlogged clayey soils with similar fine loamy over clayey soils. Some fine loamy over clayey soils with only slight seasonal waterlogging and some slowly permeable calcareous clayey soils' (SSEW, 1983). To the east of the site, soils of the Evesham 2 association are shown. These soils are described as 'slowly permeable calcareous clayey soils. Some slowly permeable seasonally waterlogged non-calcareous clayey soils' (SSEW, 1983). Finally, along the north-east boundary, soils of the Badsey 1 association are mapped. These are described as 'well drained calcareous and non-calcareous fine loamy over limestone gravel and deeper soils over gravel and shallower soils affected by groundwater' (SSEW, 1983).

AGRICULTURAL LAND CLASSIFICATION

19. 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.

20. 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.

Subgrade 3a

21. Land of good quality is mapped along the north-eastern boundary and is coincident with the underlying First Terrace Deposits (river gravels).

22. All of the land classified as Subgrade 3a suffers from a soil droughtiness limitation, due to the presence of stony subsoils. West of the sewage works, soil wetness is equally limiting. Soils comprise variably calcareous heavy clay loam topsoils, which may contain up to 7% total flints by volume (1–2% >2 cm in size). These pass to clayey upper subsoils, which may contain up to 20% total flints by volume. These overlie stony heavy clay loam lower subsoils, which proved impenetrable to the soil auger at variable depths, ranging from 43–80 cm. Pit 1 (see Appendix II) is typical of these soils and confirmed the existence of these stonier subsoils, which were measured at 42%, increasing to 45%, to a depth of 80 cm. This combination of soil properties, in the prevailing climate, reduces the amount of available water to a growing plant, resulting in a slight to moderate soil droughtiness limitation. Moisture balance calculations, which assume that a similarly stony resource extends to 120cm and is rootable, suggest that there is sufficient reserves of water for this land to be classified as Subgrade 3a. The resulting drought stress may cause the level and consistency of yields to be depressed. Within this mapping unit there is some better, less droughty land (associated with deeper soils over the river gravels) which could not be distinguished separately.

23. To the west of the sewage works, soil profiles are similar to those described above but show signs of soil wetness in the form of gleying within 40 cm of the surface. This results in these soils being assigned to Wetness Class II. This combination of imperfect drainage, topsoil texture and prevailing field capacity level (154 days) gives rise to a land classification of Subgrade 3a.

Subgrade 3b

24. Land of moderate quality has been mapped over most of the site. It occurs in conjunction with the underlying Oxford Clay and alluvium.

25. All of the land classified as Subgrade 3b suffers from a significant soil wetness limitation. Soils comprise non-calcareous heavy clay loam or clay topsoils, which may contain up to 5% total flints by volume. These overlie gleyed slowly permeable clay subsoils or pass through a slightly stony clay horizon to the less permeable clays beneath. Soil pits 2P and 3P (see Appendix II) are typical of these soils and proved the existence of these shallow poorly structured clayey subsoils. It is the depth to these slowly permeable layers (SPLs) which determines the overall ALC grade. The SPLs occur in the range 20–35 cm, which results in these soils being assigned to Wetness Class IV. This combination of poor drainage, topsoil texture and the local climate results in the land being restricted to Subgrade 3b. Excessive soil wetness adversely affects seed germination and survival, partly by a reduction in soil temperature and partly because of anaerobism. It also inhibits the development of a good root system, all of which can affect the range of crops that can be grown and the level of yield. Soil wetness also influences the sensitivity of the soil to structural damage and is, therefore, a major factor in determining the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

26. Along the south-western boundary, close to the dismantled railway line, are soils which have stony clay subsoil horizons. Soil pit 4P (see Appendix II) is typical of these profiles. Here, the stone content in the gleyed clay upper subsoil was measured at 32%. Due to the high

stone content in this layer, the structure of the soil could not be determined; a moderate structural assessment has been assumed. From 57cm, the stony clay horizon passes to a gleyed and slowly permeable clay subsoil. These wetness characteristics result in these soils being assigned to Wetness Class III. Despite being somewhat less wet than the other soils in this mapping unit, the combination of wetness class, topsoil texture and the prevailing field capacity level again restricts this land to Subgrade 3b.

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SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No. 236*, 1982.
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, Soils of 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:

Sample location map

Soil abbreviations - explanatory note

Soil pit and soil boring descriptions (boring and horizon levels)

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
2	SP33800880	OSR			27	27	4	3B	86	-17	92	-2	3A				WE	3B	SEE3P
3	SP33600870	OSR			25	25	4	3B	127	24	104	10	2				WE	3B	SEE3P
7	SP34000870	OSR			26	26	4	3B	85	-18	91	-3	3A				WE	3B	SEE3P
8	SP34100870	OSR	SE	1	30	30	4	3B	87	-16	93	-1	3A				WE	3B	SEE3P
10	SP34300870	PGR			28	28	4	3B	86	-17	92	-2	3A				WE	3B	SEE3P
12	SP33600860	OSR			28	28	4	3B	111	8	109	15	2				WE	3B	SEE3P
14	SP33800860	OSR			29	29	4	3B	87	-16	93	-1	3A				WE	3B	SEE3P
16	SP34000860	OSR	SE	1			1	2	103	0	113	19	3A				DR	3A	IMP73POSSGR2
18	SP34200860	PGR			28		2	2	83	-20	85	-9	3A				DR	3A	IMP53GRAVELY
20	SP34400860	PGR			25	25	4	3B	82	-21	88	-6	3B				WE	3B	SEE3P
22	SP34600860	PGR			28	28	4	3B	90	-13	102	8	3A				WE	3B	SEE3P
25	SP33700850	OSR			28	28	4	3B	97	-6	102	8	3A				WE	3B	SEE3P
26	SP33800850	OSR			28	28	4	3B	97	-6	102	8	3A				WE	3B	SEE3P
27	SP33900850	PGR			28	28	4	3B	86	-17	92	-2	3A				WE	3B	ATPIT3
29	SP34100850	OSR	SE	1	25	25	4	3B	78	-25	78	-16	3B				WE	3B	SEE3P
33	SP34500850	PGR			30	30	4	3B	126	23	103	9	2				WE	3B	SEE3P
35	SP34700850	RGR			30	30	4	3B	94	-9	106	12	3A				WE	3B	SAT 0+ JUNCUS
36	SP33800840	OSR			85	85	1	2	132	29	111	17	2				WK	2	SEE4P
37	SP33900840	OSR			28	28	4	3B	81	-22	87	-7	3B				WE	3B	SEE4P
38	SP34000840	OSR			30	30	4	3B	127	24	104	10	2				WE	3B	SEE3P
40	SP34200840	OSR			22	22	4	3B	87	-16	99	5	3A				WE	3B	SEE3P
42	SP34400840	PGR			30		2	3A	74	-29	75	-19	3B				WD	3A	IMP55SEE1P
43	SP34500840	PGR			30		2	3A	84	-19	87	-7	3A				WD	3A	IMP60SEE1P
44	SP34600840	PGR			28		2	3A	102	-1	106	12	3A				WD	3A	IMP80POSSGR2
45	SP35000840	FCD					1	2	70	-33	70	-24	3B				DR	3A	IMP43SEE1P
47	SP33900830	OSR			60	60	3	3B	134	31	113	19	1				WE	3B	ATPIT4
48	SP34000830	OSR			25	25	4	3B	121	18	99	5	2				WE	3B	SEE4P
49	SP34100830	OSR			25	25	4	3B	126	23	112	18	2				WE	3B	SEE4P
53	SP34500830	PGR			0	25	4	3B	88	-15	99	5	3A				WE	3B	SEE4P
55	SP34900830	FCD	NE	2			1	2	58	-45	58	-36	3B				DR	3A	IMP35SEE1P
56	SP35000830	FCD	E	2			1	2	67	-36	67	-27	3B				DR	3A	IMP43SEE1P
58	SP34000820	OSR			65	65	3	3B	135	32	115	21	1				WE	3B	SEE4P
59	SP34100820	OSR			26	26	4	3B	87	-16	99	5	3A				WE	3B	SEE3P
60	SP34200820	OSR			20	30	4	3B	99	-4	104	10	3A				WE	3B	SEE3P
62	SP34400820	LEY			25	25	4	3B	88	-15	100	6	3A				WE	3B	SEE3P
64	SP34600820	FCD			30	30	4	3B	94	-9	106	12	3A				WE	3B	SEE2P
66	SP34800820	FCD	N	2			1	2	73	-30	73	-21	3B				DR	3A	IMP44SEE1P
67	SP34900820	FCD	E	2	25	25	4	3B	76	-27	76	-18	3B				WE	3B	SEE2P
68	SP35000820	FCD	NE	2	28	28	4	3B	82	-21	88	-6	3B				WE	3B	SEE2P
69	SP35100820	FCD					1	2	86	-17	89	-5	3A				DR	3A	IMP55SEE1P
70	SP34200810	OSR			20	20	4	3B	103	0	101	7	3A				WE	3B	SEE4P
71	SP34300810	FCD			25	25	4	3B	89	-14	101	7	3A				WE	3B	SEE3P

SAMPLE NO.	GRID REF	USE	ASPECT	GRONT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
73	SP34500810	FCD			27	27	4	3B	90	-13	102	8	3A				WE	3B	SEE2P
75	SP34700810	FCD			25	25	4	3B	89	-14	101	7	3A				WE	3B	SEE2P
76	SP34800810	FCD			25	25	4	3B	96	-7	101	7	3A				WE	3B	SEE2P
77	SP34900810	FCD	E	2	20	20	4	3B	81	-22	87	-7	3B				WE	3B	SEE2P
79	SP35100810	FCD					1	2	83	-20	84	-10	3A				DR	3A	IMP55SEE1P
80	SP34200800	FCD			30	30	4	3B	92	-11	104	10	3A				WE	3B	SEE2P
82	SP34400800	FCD			30	40	4	3B	104	1	109	15	3A				WE	3B	SEE2P
84	SP34600800	FCD			30	30	4	3B	94	-9	106	12	3A				WE	3B	SEE2P
86	SP34800800	FCD			25	25	4	3B	95	-8	99	5	3A				WE	3B	SEE2P
88	SP35000800	FCD	E	2	26	26	4	3B	88	-15	100	6	3A				WE	3B	SEE2P
89	SP35100800	FCD	E	1	28	28	4	3B	96	-7	101	7	3A				WE	3B	SEE2P
90	SP34300790	FCD			25	25	4	3B	89	-14	101	7	3A				WE	3B	SEE2P
92	SP34500790	FCD			28	28	4	3B	92	-11	104	10	3A				WE	3B	ATPIT2
94	SP34700790	FCD			35	35	4	3B	97	-6	109	15	3A				WE	3B	SEE2P
96	SP34900790	FCD			25	25	4	3B	95	-8	100	6	3A				WE	3B	SEE2P
97	SP35000790	FCD					1	2	90	-13	100	6	3A				DR	3A	IMP70POSSGR2
98	SP35100790	FCD	NE	1	22	22	4	3B	94	-9	99	5	3A				WE	3B	SEE2P
99	SP35200790	FCD					1	2	90	-13	102	8	3A				DR	3A	IMP70POSSGR2
101	SP34600780	FCD			30	30	4	3B	94	-9	106	12	3A				WE	3B	SEE2P
103	SP34800780	FCD			30	30	4	3B	108	5	106	12	2				WE	3B	SEE2P
105	SP35000780	FCD	SE	1	30	30	4	3B	121	18	99	5	2				WE	3B	SEE2P
106	SP35100780	FCD	NE	1	30	30	4	3B	119	16	98	4	2				WE	3B	SEE2P
107	SP35200780	FCD	E	1			1	2	79	-24	81	-13	3B				DR	3A	IMP55SEE1P
109	SP34700770	FCD			30	30	4	3B	129	26	106	12	2				WE	3B	SEE2P
111	SP34900770	FCD			28	28	4	3B	96	-7	101	7	3A				WE	3B	SEE2P
1P	SP35000830	FCD	NE	1			1	2	75	-28	79	-15	3B				DR	3B	PIT80CM
2P	SP34700790	FCD			30	30	4	3B	84	-19	87	-7	3A				WE	3B	ATAB94
3P	SP33900850	PGR			28	28	4	3B	86	-17	92	-2	3A				WE	3B	ATAB27
4P	SP33900830	OSR			26	57	3	3B	90	-13	98	4	3A				WE	3B	ATAB47

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	
2	0-27	HCL	10YR43						0	0		0							
	27-60	C	25Y61	10YR56	M	D		Y	0	0		0			P		Y		PLASTIC
3	0-25	HCL	10YR42						0	0		0							
	25-55	C	25Y 53	10YR58	C	D		Y	0	0		0			P		Y		
	55-75	C	25Y 6252	10YR58	M	D		Y	0	0		0			P		Y		
	75-120	C	05Y 62	10YR58	M	D		Y	0	0		0			P		Y		SL.SANDY
7	0-26	HCL	10YR43						0	0		0							
	26-60	C	25Y64	10YR58	M	D		Y	0	0		0			P		Y		PLASTIC
8	0-30	HCL	10YR43						0	0		0							
	30-60	C	25Y64	10YR58	M	D		Y	0	0		0			P		Y		PLASTIC
10	0-28	HCL	25Y53						0	0		0							
	28-60	C	05Y61	10YR58	M	D		Y	0	0		0			P		Y		PLASTIC
12	0-28	C	10YR42						0	0		0							
	28-50	C	10YR53	10YR56	C	F		Y	0	0		0			P		Y		
	50-65	C	25Y 6462	10YR66	M	F		Y	0	0		0			P		Y		
	65-90	C	25Y 62	10YR68	M	D		Y	0	0		0			P		Y		
14	0-29	HCL	10YR43						0	0		0							
	29-60	C	25Y61	10YR56	M	D		Y	0	0		0			P		Y		PLASTIC
16	0-37	HCL	10YR43						0	0	HR	2							
	37-65	C	10YR54						0	0	HR	10			M			Y	FRIABLE
	65-76	C	10YR54	75YR46	C	D		S	0	0	HR	15			M			Y	IMP GRAVELY
18	0-28	MCL	25Y53						0	0		0							
	28-53	HCL	25Y64	10YR56	C	D		Y	0	0	HR	15			M			Y	IMP GRAVELY
20	0-25	C	25Y52	10YR46	M	D		Y	0	0		0							
	25-60	C	05Y61	10YR58	M	D		Y	0	0		0			P		Y		PLASTIC
22	0-28	C	10YR42	10YR46	C	D		Y	0	0		0							
	28-70	C	25Y 53	75YR58	M	D		Y	0	0		0			P		Y		
25	0-28	C	25Y 42						0	0		0							
	28-40	C	25Y 5253	10YR66	C	F		Y	0	0		0			P		Y		
	40-80	C	25Y 6263	10YR6858	M	F		Y	0	0		0			P		Y		
26	0-28	C	25Y 42						0	0		0							
	28-65	C	25Y 6462	10YR66	M	F		Y	0	0		0			P		Y		
	65-80	C	05Y 62	10YR68	M	F		Y	0	0		0			P		Y		
27	0-28	HCL	10YR43						0	0		0							
	28-60	C	25Y61	10YR56	M	D		Y	0	0		0			P		Y		PLASTIC

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	
29	0-25	HCL	10YR43						0	0		0							
	25-50	C	25Y53	10YR56	M	D		Y	0	0		0		P		Y			PLASTIC
33	0-30	C	10YR42						0	0		0							
	30-60	C	25Y 53	10YR58	M	D		Y	0	0		0		P		Y			
	60-70	C	25Y 5362	10YR66	C	D		Y	0	0	HR	20		M			Y		
	70-120	C	25Y 6163	10YR58	M	D		Y	0	0		0		P		Y	Y		
35	0-30	HCL	25Y 32	10YR46	C	D		Y	0	0		0							
	30-70	C	25Y 6263	10YR58	M	D		Y	0	0		0		P		Y			
36	0-25	HCL	10YR42						0	0	HR	2							
	25-45	C	25Y 64						0	0	HR	5		M			Y		
	45-85	C	10YR64						0	0	HR	10		M			Y		
	85-120	C	25Y 61	10YR58	M	D		Y	0	0		0		P		Y	Y		
37	0-28	HCL	10YR42						0	0	HR	5							
	28-55	C	25Y 6264	10YR68	C	D		Y	0	0	HR	5		P		Y			
	55-60	C	25Y 64						0	0	HR	40		M			Y		IMP GRAVELY
38	0-30	HCL	10YR42						0	0	HR	2							
	30-70	C	25Y 5354	10YR58	C	F		Y	0	0	HR	3		P		Y			
	70-120	C	25Y 53	10YR58	M	D		Y	0	0		0		P		Y			PLASTIC
40	0-22	C	25Y 4252						0	0	HR	2							
	22-70	C	25Y 6462	10YR68	M	D		Y	0	0		0		P		Y			
42	0-30	HCL	10YR42						0	0	HR	5						Y	
	30-50	HCL	25Y 5354	10YR56	C	D		Y	0	0	HR	40		M			Y		
	50-55	HCL	25Y 5354	10YR56	C	D		Y	0	0	HR	60		M			Y		IMP GRAVELY
43	0-30	HCL	10YR42						0	0	HR	2							
	30-45	C	10YR5354	10YR56	C	F		Y	0	0	HR	10		M			Y		
	45-60	HCL	25Y 64	10YR66	C	F		Y	0	0	HR	50		M			Y		IMP GRAVELY
44	0-28	HCL	10YR42						0	0	HR	2							
	28-55	C	25Y 53	10YR58	M	D		Y	0	0	HR	5		M					
	55-80	HCL	25Y 63	10YR58	M	D		Y	0	0	HR	40		M			Y		IMP GRAVELY
45	0-27	HCL	10YR43						1	0	HR	3						Y	
	27-43	C	10YR44						0	0	HR	10		M			Y		IMP GRAVELY
47	0-27	HCL	10YR42						0	0	HR	2							
	27-60	C	25Y 64	10YR56	C	F		Y	0	0	HR	20		M					
	60-120	C	25Y 61	10YR58	C	D		Y	0	0		0		P		Y			
48	0-25	HCL	25Y 42						1	0	HR	5							
	25-70	C	25Y 6462	10YR56	C	F		Y	0	0	HR	5		P		Y	Y		
	70-120	C	05Y 6361	10YR68	M	F		Y	0	0	HR	5		P		Y	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	
49	0-25	HCL	10YR42						0	0	HR	5							
	25-65	C	25Y 5354	10YR58	C	F		Y	0	0		0			P		Y		
	65-120	C	25Y 6264	10YR68	M	D		Y	0	0	HR	20			P		Y	Y	
53	0-25	HCL	10YR32	10YR46	C	D		Y	0	0		0							
	25-55	C	25Y 53	10YR58	M	D		Y	0	0	HR	5			P		Y		
	55-70	C	25Y 52	10YR58	M	D		Y	0	0	HR	15			P		Y	Y	
55	0-27	HCL	10YR43						2	0	HR	4						Y	
	27-35	C	10YR44						0	0	HR	15			M			Y	IMP GRAVELY
56	0-27	HCL	10YR43						2	0	HR	7						Y	
	27-43	C	10YR44						0	0	HR	15			M			Y	IMP GRAVELY
58	0-25	HCL	10YR42						0	0	HR	2						Y	
	25-65	C	25Y 64	10YR66	C	F		Y	0	0		0			M			Y	GLEYED SEE4P
	65-120	C	25Y 61	10YR58	C	D		Y	0	0		0			P		Y	Y	
59	0-26	C	10YR42						0	0	HR	2							
	26-70	C	25Y 6264	10YR66	M	D		Y	0	0	HR	3			P		Y		
60	0-20	HCL	10YR42						0	0		0							
	20-30	C	25Y 61	10YR58	C	D		Y	0	0		0			M				
	30-80	C	25Y 61	10YR58	M	D		Y	0	0		0			P		Y		
62	0-25	C	25Y 42						0	0	HR	2							
	25-70	C	25Y 6162	10YR5868	M	D		Y	0	0		0			P		Y		
64	0-30	HCL	10YR42	10YR66	F	F			0	0		0							
	30-70	C	10YR63	10YR58	M	D		Y	0	0		0			P		Y		
66	0-27	HCL	25Y44						1	0	HR	3						Y	
	27-38	C	10YR56						0	0		0			M			Y	
	38-44	C	10YR56						0	0	HR	20			M			Y	IMP GRAVELY
67	0-25	HCL	25Y44						1	0	HR	4							
	25-50	C	25Y64	25Y64	C	D		Y	0	0		0			P		Y		PLASTIC
68	0-28	C	25Y53						1	0	HR	3							
	28-60	C	25Y64	25Y68	C	D		Y	0	0		0			P		Y		PLASTIC
69	0-32	HCL	10YR43						1	0	HR	3						Y	
	32-55	C	75YR46						0	0	HR	10			M			Y	
70	0-20	HCL	10YR42						0	0	HR	1							
	20-60	C	25Y 62	10YR58	C	D		Y	0	0		0			P		Y		
	60-90	C	25Y 62	10YR58	M	D		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	
71	0-25	C	25Y 42						0	0		0							
	25-70	C	05Y 51	75YR58	M	D		Y	0	0		0		P			Y		
73	0-27	C	10YR42						0	0		0							
	27-55	C	10YR51	10YR58	C	D		Y	0	0		0		P			Y		
	55-70	C	25Y 51	75YR46	M	D		Y	0	0		0		P			Y		
75	0-25	C	10YR42	10YR66	F	F			0	0		0							
	25-50	C	25Y 52	10YR58	C	D		Y	0	0		0		P			Y		
	50-70	C	25Y 63	10YR58	M	D		Y	0	0		0		P			Y		
76	0-25	C	25Y42						0	0		0							
	25-45	C	05Y52	10YR58	C	D		Y	0	0		0		P			Y		
	45-80	C	05Y62	10YR58	M	D		Y	0	0		0		P			Y		
77	0-20	HCL	10YR53						1	0	HR	3							
	20-60	C	25Y63	10YR58	M	D		Y	0	0		0		P			Y		PLASTIC
79	0-28	HCL	10YR4243						0	0	HR	5							
	28-50	C	10YR5456						0	0	HR	10		M				Y	
	50-55	HCL	10YR5666						0	0	HR	50		M				Y	IMP GRAVELY
80	0-30	HCL	10YR42						0	0	HR	2							
	30-50	C	25Y 52	10YR58	C	D		Y	0	0		0		P			Y		
	50-70	C	25Y 6162	10YR68	M	D		Y	0	0	HR	5		P			Y		
82	0-30	HCL	10YR42						0	0		0							
	30-40	C	10YR42	10YR68	C	D		Y	0	0		0		P			Y		
	40-80	C	25Y 61	10YR58	M	D		Y	0	0		0		P			Y		
84	0-30	HCL	10YR42	75YR46	F	D			0	0		0							
	30-40	C	10YR42	75YR46	C	D		Y	0	0		0		P			Y		
	40-70	C	25Y 61	10YR58	M	D		Y	0	0		0		P			Y		
86	0-25	C	25Y 42						0	0		0							
	25-55	C	25Y 52	10YR56	M	D		Y	0	0	HR	2		P			Y	Y	
	55-80	C	05Y 61	10YR58	M	D		Y	0	0	HR	5		P			Y	Y	
88	0-26	C	25Y53						1	0	HR	3							
	26-70	C	25Y64	25Y68	C	D		Y	0	0		0		P			Y		PLASTIC
89	0-28	HCL	25Y 42						0	0	HR	5						Y	
	28-55	C	25Y 52	10YR56	C	D		Y	0	0	HR	5		P			Y	Y	
	55-80	C	25Y 62	10YR68	M	D		Y	0	0		0		P			Y	Y	
90	0-25	C	10YR42						0	0		0							
	25-50	C	25Y 63	10YR58	C	D		Y	0	0		0		P			Y		
	50-70	C	25Y 61	10YR68	M	D		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	
92	0-28	HCL	25Y 42						0	0	HR	2							
	28-38	C	25Y 5262	10YR58	C	D		Y	0	0		0		P			Y		
	38-70	C	25Y 61	10YR68	M	D		Y	0	0		0		P			Y		
94	0-35	HCL	10YR42	75YR46	F	D			0	0		0							
	35-45	C	10YR52	10YR66	C	D		Y	0	0		0		P			Y		
	45-70	C	25Y 61	10YR58	M	D		Y	0	0		0		P			Y		
96	0-25	C	25Y 42						0	0		0							
	25-45	C	05Y 52	10YR58	C	D		Y	0	0		0		P			Y		
	45-80	C	05Y 62	10YR68	M	D		Y	0	0	HR	2		P			Y		
97	0-28	HCL	10YR4342						1	0	HR	5						Y	
	28-50	C	10YR5456						0	0	HR	10		M				Y	
	50-70	C	75YR56						0	0	HR	40		M				Y	IMP GRAVELY
98	0-22	C	25Y 42						0	0	HR	2							
	22-60	C	25Y 5264	10YR66	C	D		Y	0	0		0		P			Y		
	60-80	C	25Y 61	10YR68	M	D		Y	0	0		0		P			Y		
99	0-28	HCL	10YR4243						1	0	HR	5							
	28-65	C	10YR5456						0	0	HR	20		M				Y	
	65-70	HCL	10YR56						0	0	HR	20		M				Y	IMP GRAVELY
101	0-30	HCL	10YR42						0	0		0							
	30-45	C	25Y 53	10YR56	C	D		Y	0	0		0		P			Y		
	45-70	C	25Y 61	10YR68	M	D		Y	0	0		0		P			Y		
103	0-30	HCL	10YR42						0	0		0							
	30-55	C	25Y 5453	10YR58	M	D		Y	0	0		0		P			Y		
	55-90	C	05Y 5262	10YR68	M	D		Y	0	0		0		P			Y		
105	0-30	C	10YR42						1	0	HR	5							
	30-70	C	10YR5354	10YR56	C	F		Y	0	0	HR	3		P			Y	Y	
	70-85	C	25Y 5354	10YR58	M	D		Y	0	0	HR	15		P			Y	Y	
	85-120	C	05Y 61	10YR68	M	D		Y	0	0		0		P			Y	Y	
106	0-30	C	25Y 42						0	0	HR	5							
	30-50	C	25Y 5253	10YR56	C	F		Y	0	0		0		P			Y		
	50-85	C	25Y 64	10YR68	M	D		Y	0	0	HR	30		M				Y	
	85-120	C	05Y 61	10YR68	M	D		Y	0	0		0		P			Y	Y	
107	0-30	HCL	10YR42						1	0	HR	5						Y	
	30-55	HCL	10YR56						0	0	HR	20		M				Y	IMP GRAVELY
109	0-30	HCL	10YR42						0	0		0							
	30-75	C	10YR5354	10YR56	C	D		Y	0	0		0		P			Y		
	75-100	C	25Y 6264	10YR58	C	D		Y	0	0	CH	5		P			Y	Y	
	100-120	C	05Y 61	10YR58	M	D		Y	0	0	HR	2		P			Y	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	
111	0-28	C	10YR42						0	0	HR	2							
	28-60	C	25Y 5264	10YR68	M	D		Y	0	0		0			P		Y		
	60-80	C	25Y 61	10YR68	M	D		Y	0	0		0			P		Y		
1P	0-26	HCL	10YR43						2	0	HR	12						Y	WET SIEVED
	26-56	C	75YR46						0	0	HR	42			M			Y	WET SIEVED
	56-80	C	10YR64						0	0	HR	45			M			Y	WET SIEVED
2P	0-30	HCL	25Y53						0	0		0							
	30-55	C	25Y62	10YR58	M	D		Y	0	0		0	WKCAB	FM	P	Y		Y	
3P	0-28	HCL	10YR43						0	0		0							
	28-40	C	25Y53	10YR56	M	D		Y	0	0		0	MDCAB	FM	P	Y		Y	
	40-60	C	05Y51	10YR56	M	D		Y	0	0		0	MDCAB	FM	P	Y		Y	
4P	0-26	HCL	10YR43						0	0		0							
	26-57	C	25Y64	10YR58	C	F		Y	0	0	HR	32			M			Y	WET SIEVED
	57-75	C	05Y51	10YR58	M	D		Y	0	0		0	MDCAB	VF	P	Y		Y	