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**WEST OXFORDSHIRE DISTRICT LOCAL PLAN
Land at Minster Lovell, Oxfordshire**

**Agricultural Land Classification
ALC Map and Report**

November 1998

**Resource Planning Team
Eastern Region
FRCA Reading**

**RPT Job Number: 3305/071/98
MAFF Reference: EL 33/1860**

AGRICULTURAL LAND CLASSIFICATION REPORT

WEST OXFORDSHIRE DISTRICT LOCAL PLAN LAND AT MINSTER LOVELL, OXFORDSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 65 hectares of land to the east and west of Minster Lovell, to the west of Witney in Oxfordshire. The survey was carried out during November 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). It was carried out in connection with MAFF's statutory input to the West Oxfordshire Local Plan. This survey supersedes any previous ALC information for this land. A small proportion of the land within this survey area was classified in 1993 (FRCA Ref: 3305/138/93). Information from this study has been incorporated into the 1998 classification.
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 in the east of the survey area was in arable use, either lying in stubble or winter cereals. The land adjacent to the village was mostly grassland, although one area contained fruit trees. Areas marked as 'Other Land' include housing with associated gardens, industrial areas, including storage sites for caravans, hard-core and soil, a disused and overgrown quarry, tracks and roadways as well as a variety of agricultural buildings, some of which were in current use and the remainder were derelict.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. 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.
7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. In total, 62 borings and 6 soil pits were described in addition to the pit and 2 borings described in 1993.
8. The agricultural land on this site has been classified in the range Subgrade 3a (good quality) to Grade 4 (poor quality) with substantial areas mapped as Subgrade 3b (moderate quality) land. The principal limitations to land quality include soil droughtiness and soil wetness.

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

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	7.4	13.5	11.4
3b	44.3	80.7	68.2
4	3.2	5.8	4.9
Other land	10.1	-	15.5
Total surveyed area	54.9	100	84.5
Total site area	65.0	-	100

9. The majority of the land within this area of survey is principally limited by soil droughtiness; soil depth may also have an influence in some areas, although this limitation is not overriding. The soils described during the survey comprise calcareous clay loams and clays overlying limestone at varying depths. The variable depth of the soil resource affects the amount of moisture available for plant growth. In the local climate, where the limestone occurs at moderate depths, Subgrade 3a is appropriate. As the soil resource becomes shallower over the substrate, land quality decreases to the extent that first the land is restricted to Subgrade 3b and then Grade 4. As a result, crop yields and the consistency of these yields are likely to be adversely affected, especially if conditions during the growing season are dry. As land quality decreases so yield consistency is likely also to decrease.
10. The remaining land is limited by soil wetness and is classified as Subgrade 3b. It is mainly limited to the area adjacent to the Subgrade 3a land across the centre of the survey area. Soils comprise a heavy clay loam or clay topsoil overlying clay subsoils. The majority of the clay subsoils significantly impede drainage which, in combination with topsoil texture and local climatic parameters, leads to Subgrade 3b being the most appropriate classification. Soil wetness reduces the versatility of the land in terms of access by machinery (e.g. for cultivations or harvesting) and grazing by livestock if damage to the soil is to be avoided. Soil wetness will also adversely affect seed germination and root growth and will therefore reduce the level and consistency of yields.

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).
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.

Table 2: Climatic and altitude data

Factor	Units	Values		
		SP 313 096	SP 316 106	SP 311 103
Grid reference	N/A	SP 313 096	SP 316 106	SP 311 103
Altitude	m, AOD	110	115	116
Accumulated Temperature	day°C (Jan-June)	1391	1385	1383
Average Annual Rainfall	mm	727	728	730
Field Capacity Days	days	160	160	161
Moisture Deficit, Wheat	mm	98	97	97
Moisture Deficit, Potatoes	mm	87	86	86
Overall climatic grade	N/A	Grade 1	Grade 1	Grade 1

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 are not believed to 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 approximate range of 110-120m AOD. The highest land occurs in the north of the site with the lowest towards the south. The slopes between are slight and as such gradient is not a significant factor in the classification of this site.

Geology and soils

17. The most detailed published geological information for the site (BGS, 1968) shows the area of survey to be underlain by a complex pattern of Jurassic deposits. These include White Limestone and Forest Marble Clays with Limestone principally to the north; Cornbrash and Forest Marble Clays to the south with further outcrops of the Forest Marble Clays with Limestone deposit also in this area.
18. According to the most recent published information available for this area (SSEW, 1983) the entire area is underlain by a single soil association, namely Elmton 3. These soils are described as, 'Shallow, well drained brashy calcareous fine loamy soils over limestone. Some deeper slowly permeable seasonally waterlogged, mainly calcareous, clayey soils' (SSEW, 1983). The soils observed during the survey are within the range of this description.
19. The land to the south of Bushey Ground Farm within this survey area is covered by the more detailed (1:25,000 scale) soil map published by the Soil Survey of England and Wales as Soil Survey Record No. 77 (1982). This shows the land to be underlain by a combination of soils from the Sherborne series and the Evesham/Hornton and Didmarton/Evesham complexes. The descriptions accompanying these soil types are covered by that given in paragraph 18 above.

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 on 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.

Subgrade 3a

22. Good quality land has been mapped in a single unit towards the centre of the area surveyed. The soils here are typified by soil pits 3P and 5P (see Appendix II), even though 5P is outside the 3a unit. All the profiles observed were well drained (Wetness Class I) and calcareous. The soils typically comprise medium or heavy clay loam topsoils passing to similar, and slightly heavier (clay), subsoil horizons which were impenetrable to the soil auger between 42 and 82cm. The pit observations indicate that the depth where the soil auger was impenetrable equates with an increase in limestone content. In the topsoil stone contents were typically slight, in the range 2-10% limestone brash by volume with a maximum of 6% >2cm diameter. In the upper subsoil, a maximum of 20% weathered and hard limestone was recorded, although around 6% is more typical. Occasionally, a third horizon was recorded which was impenetrable within a few centimetres and contained between 25 and 50% hard and weathered soft limestone. The pits show that these horizons, impenetrable to the auger, contain up to 60% hard limestone brash in a clayey matrix. In the local climate these soil properties lead to Subgrade 3a being appropriate as the moisture available to plants is restricted by the volume of stones present in the profile as a whole. The result is that crop yields are adversely affected and the consistency of these yields is less predictable, especially if conditions during the growing season are dry.

Subgrade 3b

23. The majority of the agricultural land within this survey area has been classified as being of moderate quality. Land quality is principally restricted by either soil droughtiness or soil wetness; soil depth is also a consideration in parts of these units, although not an overriding limitation. Soil pits 1P, 2P and 6P (see Appendix II) are typical of the range of observations in this area.
24. The area restricted principally by soil droughtiness to this classification is located towards the north of the site. All the profiles observed were well drained (Wetness Class I) and calcareous. Soils typically comprise medium/heavy clay loam or clay topsoils passing to similar shallow subsoil horizons. The subsoils were impenetrable to the soil auger between 20 and 45cm. The relevant pit observation (1P) extended to a maximum of 65cm and indicates that the surrounding auger borings are likely to have also been impenetrable over very stony clayey horizons and bedrock. The stone contents observed in the topsoil are slight to moderate overall with a maximum of 25% by volume of hard limestone brash being recorded on occasion, including 8% >2cm; 5-10% limestone by volume was more typical. Subsoil stone content was in the range 5-60% by volume of hard and softer weathered limestone brash; the pit (1P) contained 12% limestone in the upper subsoil. The lower subsoil horizon, impenetrable to the soil auger, contained 55% by volume of hard and soft limestone to 55cm, at which point limestone bedrock was encountered into which roots were observed to penetrate a maximum of 10cm. The net result of these combined soil factors in the local

climate is that the moisture available to plants is significantly restricted so that overall crop yields are likely to be adversely affected and the consistency of these yields is also variable, especially if conditions are dry during the growing season. Occasional observations within the Subgrade 3b map units, including the pit observation, 5P, may be of slightly better or worse quality but their location and distribution preclude separate mapping.

25. The second soil type within the Subgrade 3b map units is principally limited by soil wetness. They are represented by the pit observations 2P and 6P (see Appendix I). The relevant observations are mostly located towards the Subgrade 3a unit in the centre of the site and they broadly correspond with the location of the Forest Marble Clays on the geology map (BGS, 1982). Soils in these areas comprise a heavy clay loam or clay topsoil overlying clay subsoils. The upper subsoils rarely exhibit any signs of wetness but from between 35 and 70cm the profiles become gleyed and slowly permeable. This results in Wetness Classes II, III or IV being applied which given the local climate and the observed topsoil textures lead to a Subgrade 3b classification on the basis of soil wetness. Excessive wetness in the soil may adversely affect crop growth and development. It can also limit the flexibility of the land by reducing the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

Grade 4

26. The area mapped as poor quality is located to the west of the area surveyed and encompasses the 1993 survey area. The principal limitation in this area is soil droughtiness; soil depth is also a consideration here but it is not the principal restriction to land quality. The area approximates to that which has previously been mapped (BGS, 1982) as being underlain by Jurassic White Limestone. The profiles in this area are well drained (Wetness Class I), calcareous and typified by the soil pit 4P (see Appendix II). Soils comprise a clay topsoil overlying a shallow and very stony clay subsoil, directly overlying limestone bedrock between 18 and 38cm. As such, these soils experience a Subgrade 3b soil depth limitation but are further downgraded because of the limited rooting depth. Roots were observed to extend a short distance into the bedrock, to a maximum of 42cm overall. The result is a severe droughtiness limitation which restricts the range of crops that may be grown and may result in crop failure if conditions are not favourable.

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SOURCES OF REFERENCE

British Geological Survey (1982) *Sheet No. 236, Witney. Solid and Drift Edition, 1:50,000 Scale.*
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Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1982) *Soils in Oxfordshire I, Sheet SP30 (Witney South). 1:25,000 Scale.*
SSEW: Harpenden.

Soil Survey of England and Wales (1983) *Sheet 6 Soils of South East England. 1:250,000 Scale*
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 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
DCW:	Deciduous woodland	CFW:	Coniferous woodland	OTH:	Other
HTH:	Heathland	BOG:	Bog or marsh	SAS:	Set-Aside
		HRT:	Horticultural crops	PLO:	Ploughed

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

4. **GLEYS/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. **GLEYS:** 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

ZR: soft, argillaceous, or silty rocks

MSST: soft, medium grained sandstone

SI: soft weathered igneous/metamorphic rock

FSST: soft, fine grained sandstone

CH: chalk

GS: gravel with porous (soft) stones

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
ST: strongly developed

MD: moderately developed

Ped size

F: fine
C: coarse

M: medium

Ped shape

S: single grain
GR: granular
SAB: sub-angular blocky
PL: platy

M: massive
AB: angular blocky
PR: prismatic

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

L: loose

VF: very friable

FR: friable

FM: firm

VM: very firm

EM: extremely firm

EH: extremely hard

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	ASPECT		--WETNESS--				-HEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS	
		USE		GRONT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT		
1	SP31701090	STB	N	1			1	2	51	-46	51	-35	3B				DR	3B	IAUG20 IDUG50
2	SP31771088	STB	N	1			1	3A	47	-50	47	-39	3B				DR	3B	IAUG22 IDUG40
4	SP31621079	STB	E	1			1	3A	40	-57	40	-46	4				DR	3B	IMP 30 1P
5	SP31721080	STB	E	2	55	55	3	3B	127	30	105	19	1				WE	3B	
6	SP31501070	PGR	E	1			1	2	48	-49	48	-38	3B				DR	3B	IMP 30 LSTONE
7	SP31601070	CER	E	1	55	55	3	3B	127	30	106	20	1				WE	3B	Q SPL 55 CM
8	SP31701070	CER	W	1			1	2	46	-51	46	-40	4				DR	3B	IMP 30 LSTONE
9	SP31801070	STB					1	2	33	-64	33	-53	4				DR	3B	IMP 20 LSTONE
10	SP31901070	STB			44	44	3	3B	88	-9	97	11	3A				WE	3B	IMP 65 LSTONE
12	SP31601060	CER	N	1			1	2	44	-53	44	-42	4				DR	3B	IMP 30 1P
13	SP31701060	CER					1	2	65	-32	65	-21	3B				DR	3B	IMP 40 LSTONE
14	SP31801060	CER			25	25	4	3B	97	0	107	21	3A				WE	3B	IMP 72 LSTONE
18	SP31491047	RGR					1	3A	45	-52	45	-41	4				DR	4	IMP 30 LSTONE
19	SP31601050	CER					1	2	34	-63	34	-52	4				DR	4	IMP 25 LSTONE
20	SP31701050	CER					1	2	51	-46	51	-35	3B				DR	3B	IMP 35 LSTONE
21	SP31801050	CER	S	2	25	25	4	3B	121	24	99	13	2				WE	3B	2P LOCATION
23	SP31131027	PGR			45	45	3	3B	99	2	104	16	3A				WE	3B	6P LOCATION
24	SP31421042	PGR					1	3A	35	-62	35	-51	4				DR	3B	IMP 25 LSTONE
25	SP31531040	CER					1	3A	59	-38	59	-27	3B				DR	3B	IMP 40 LSTONE
26	SP31601040	CER					1	1	85	-12	91	5	3A				DR	3A	IMP 58 LSTONE
27	SP31701040	CER	E	1			1	2	76	-21	76	-10	3B				DR	3B	IMP 48 Q 3ADR
28	SP31801040	CER	S	1	35	35	4	3B	88	-9	96	10	3A				WE	3B	IMP 62 LSTONE
29	SP31001034	RGR					1	3A	41	-56	41	-47	4				DR	4	IMP 35 LSTONE
30	SP31101036	RGR					1	3A	39	-58	39	-49	4				DR	4	IMP 30 4P LOC
31	SP31431030	PGR					1	3A	42	-55	42	-44	4				DR	3B	IMP 30 LSTONE
32	SP31541030	CER					1	2	67	-30	67	-19	3B				DR	3B	IMP 45 LSTONE
33	SP31601030	CER					1	1	43	-54	43	-43	4				DR	3B	IMP 26 LSTONE
34	SP31701030	CER	S	1			1	2	88	-9	94	8	3A				DR	3A	IMP 62 LSTONE
35	SP31801030	CER					1	2	50	-47	50	-36	3B				DR	3B	IMP 30 LSTONE
36	SP31001023	PGR			70	70	2	3B	125	28	108	20	2				WE	3B	
37	SP31101021	PGR			30	30	4	3B	102	5	101	13	2				WE	3B	SEE 6P
38	SP31401020	PGR					1	3A	45	-52	45	-41	4				DR	3B	IMP 30 SLST
39	SP31501020	PGR			24	24	2	3B	67	-30	67	-19	3B				WD	3B	IMP 47 LSTONE
40	SP31601020	CER					1	2	60	-37	60	-26	3B				DR	3B	IMP 36 LSTONE
41	SP31701020	CER					1	2	90	-7	98	12	3A				DR	3A	IMP 60 LSTONE
42	SP31801020	CER					1	2	56	-41	56	-32	3B				DR	3B	IMP 40 LSTONE
43	SP31901020	CER			30	30	4	3B	97	0	101	13	3A				WE	3B	SEE 2P
44	SP31001010	PGR			55	55	3	3B	131	34	111	25	1				WE	3B	Q SPLS
45	SP31101010	PGR					1	2	87	-10	91	5	3A				DR	3A	IMP 58 LSTONE
46	SP31401012	PGR			22		2	3B	46	-51	46	-40	4				WD	3B	IMP 38 LSTONE
47	SP31501010	PGR					1	3A	73	-24	74	-12	3B				DR	3B	IMP 55 LSTONE
48	SP31601010	PGR			38	38	4	3B	92	-5	97	11	3A				WE	3B	SEE2P SLGLY 28

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB						DRT
49	SP31701010	CER N	1		1	2	54	-43	54	-32	3B			DR	4	IMP 35 LSTONE
50	SP31801010	CER N	2	55 55	3	3B	110	13	109	21	2			WE	3B	SEE2P SLGLY 28
51	SP31901010	CER N	2	50 50	3	3B	106	9	111	23	2			WE	3B	SEE 2P
53	SP31421000	PGR		50 50	3	3B	102	5	107	19	2			WE	3B	
54	SP31701000	CER		25 25	4	3B	95	-2	100	14	3A			WE	3B	
55	SP31801000	CER			1	1	56	-41	56	-30	3B			DR	3B	IMP 35 LSTONE
56	SP31901000	CER			1	2	59	-38	59	-27	3B			DR	3B	IMP 42 LSTONE
57	SP31320990	PGR		45 45	3	3B	107	10	105	17	2			WE	3B	
59	SP31800990	CER		25 25	4	3B	90	-7	95	9	3A			WE	3B	
60	SP31900990	CER			1	2	84	-13	87	1	3A			DR	3A	IMP 55 LSTONE
61	SP31300980	PGR			1	3A	53	-44	53	-35	3B			DR	3B	IMP 35 LSTONE
62	SP31809800	PLO		41 41	3	3B	97	0	105	19	3A			WE	3B	
63	SP31200970	PGR E	2		1	2	68	-29	68	-20	3B			DR	3B	IMP42 LSTONE
64	SP31300970	PGR W	1		1	2	31	-66	31	-57	4			DR	4	IMP19 LSTONE
65	SP31800958	PGR W	1	50 50	3	3B	102	5	107	19	2			WE	3B	
66	SP31300962	RGR W	1	25 25	4	3B	85	-12	91	3	3A			WE	3B	
67	SP31000950	PLO E	1		1	2	43	-54	43	-45	4			DR	3B	IMP 30 LSTONE
68	SP31100950	PLO		60 60	3	3B	125	28	105	17	2			WE	3B	SLGLY 28
69	SP31200950	PGR W	1		1	2	73	-24	75	-13	3B			DR	3B	I55 BRASH Q3A
70	SP31300950	PGR W	1		1	2	52	-45	52	-36	3B			DR	3B	IMP 35 LSTONE
1P	SP31701060	CER E	1		1	2	74	-23	76	-10	3B			DR	3B	IMP 65 @ASP13
2P	SP31801050	CER S	1	39 39	4	3B	102	5	107	21	2			WE	3B	PIT @ ASP21
3P	SP31721028	CER S	1		1	2	93	-4	100	12	3A			DR	3A	IMP82 NR ASP34
4P	SP31101036	RGR			1	3A	36	-61	36	-52	4			DR	4	IMP44 ROOTS42
5P	SP31200970	PGR			1	2	78	-19	85	-3	3A			DR	3A	IMP70 ASP63
6P	SP31131027	PGR		46 46	3	3B	104	7	109	21	2			WE	3B	PIT 80 @ASP23

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS			CALC	
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	CONSIST	STR		POR
1	0-24	HCL	10YR43						8	5	HR	25				Y	
	24-50	C	10YR56						0	0	HR	60	M			Y	IMP 50 LSTONE
2	0-25	C	10YR43						5	0	HR	15				Y	
	25-40	C	10YR46						0	0	HR	60	M			Y	IMP 40 LSTONE
4	0-25	C	10YR43						3	0	HR	15				Y	
	25-30	C	10YR46						0	0	HR	60	M			Y	IMP 30 LSTONE
5	0-28	HCL	10YR43						4	1	HR	10				Y	
	28-55	C	10YR44	10YR58	C	D		S	0	0	HR	5			Y	Y	+5% SLST
	55-120	C	05Y 6162	10YR5658	C	D		Y	0	0		0	P		Y	Y	
6	0-20	HCL	10YR33						0	0	HR	5				Y	
	20-30	C	10YR46						0	0	HR	15	M			Y	IMP 30 LSTONE
7	0-28	HCL	10YR43						0	0	HR	5					
	28-55	C	10YR46						0	0	HR	10	M			Y	
	55-75	C	25Y 63	10YR56	C	F		Y	0	0	HR	5	P		Y	Y	
	75-120	C	25Y 61	10YR58	C	D		Y	0	0	SLST	5	P		Y	Y	
8	0-30	HCL	10YR43						9	3	HR	15				Y	IMP 30 LSTONE
9	0-20	HCL	10YR43						6	0	HR	10				Y	IMP 20 LSTONE
10	0-29	C	10YR43						1	0	HR	5					
	29-44	C	10YR44						0	0	HR	5	M				
	44-65	C	25Y 62	10YR56	C	D		Y	0	0	HR	2	P		Y	Y	IMP 65 LSTONE
12	0-25	HCL	10YR43						7	1	HR	15				Y	
	25-30	HCL	10YR44						0	0	HR	40	M			Y	IMP 30 LSTONE
13	0-30	HCL	10YR43						2	0	HR	8				Y	1P LOCATION
	30-40	C	10YR44						0	0	HR	12	M			Y	+5%SLST IMP 40
14	0-25	HCL	10YR42						0	0	HR	2					
	25-40	C	10YR53	10YR56	C	D		Y	0	0		0	P		Y		
	40-72	C	25Y 53	25Y62	C	D		Y	0	0		0	P		Y	Y	IMP 72 LSTONE
18	0-20	C	10YR43						0	0	HR	5				Y	
	20-30	C	10YR44						0	0	HR	25	M			Y	IMP 30 LSTONE
19	0-20	HCL	10YR44						10	5	HR	20				Y	3A TSST
	20-25	C	10YR46						0	0	HR	40	M			Y	IMP 25 LSTONE
20	0-30	HCL	10YR43						12	6	HR	20				Y	3A TSST
	30-35	HCL	10YR44						0	0	HR	15	M			Y	IMP 35 LSTONE

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC			
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		POR	IMP	SPL
37	0-30	SCL	10YR32					0	0	HR	3				Y			
	30-65	C	10YR53	10YR58	C	D		Y	0	0	0		P		Y	Y		
	65-90	C	25Y 64	10YR58	M	D		Y	0	0	SLST	10		P		Y	Y	
38	0-27	C	10YR44						0	0	HR	5				Y		
	27-30	SLST	10YR83						0	0	0			P		Y	IMP 30 SLST	
39	0-24	C	10YR44						0	0	HR	5				Y		
	24-47	C	25Y 62	10YR58	C	D		Y	0	0	HR	5		P		Y	Y	IMP 47 LSTONE
40	0-36	HCL	10YR43						0	0	HR	8				Y	IMP 36 LSTONE	
41	0-28	HCL	10YR43						0	0	HR	5				Y		
	28-60	C	10YR44						0	0	HR	2		M		Y	IMP 60 LSTONE	
42	0-28	HCL	10YR43						2	0	HR	10				Y		
	28-40	C	10YR46						0	0	HR	50		M		Y	IMP 40 LSTONE	
43	0-30	HCL	10YR43						0	0	HR	3				Y		
	30-55	C	25Y 5462	10YR58	C	F		Y	0	0	SLST	5		P		Y	Y	
	55-80	C	25Y 6362	10YR58	C	D		Y	0	0	SLST	15		P		Y	Y	
44	0-25	HZCL	10YR43						0	0	HR	2				Y		
	25-55	C	10YR56	75YR46	C	F	MANY MN	S	0	0	HR	3		M		Y	SLIGHTLY GLEYED	
	55-120	C	25Y 63	10YR66	C	D		Y	0	0	HR	10		P		Y	Y	
45	0-22	HZCL	10YR43						0	0	HR	3				Y		
	22-38	C	10YR54	10YR46	F	D			0	0	HR	5		M		Y		
	38-58	HZCL	25Y 64 54						0	0	HR	25		M		Y	IMP 58 LSTONE	
46	0-22	C	10YR43						0	0	HR	3				Y		
	22-38	C	10YR52 54	10YR58	C	F		Y	0	0	HR	5		P		Y	IMP 38 LSTONE	
47	0-25	C	10YR43						0	0	HR	5				Y		
	25-45	C	10YR44						0	0	HR	10		M		Y	+10% SLST	
	45-55	C	10YR56						0	0	HR	50		M		Y	+10% SLST	
48	0-28	C	10YR44						0	0	HR	5				Y		
	28-38	C	10YR54	10YR56	C	F		S	0	0	SLST	5		M		Y	SLIGHTLY GLEYED	
	38-80	C	25Y 61	10YR58	C	D		Y	0	0	SLST	20		P		Y	Y	
49	0-25	HCL	10YR43						4	2	HR	10				Y		
	25-35	HCL	10YR44						0	0	HR	10				Y	+10%SLST IMP35	
50	0-28	HCL	10YR43						0	0	HR	3						
	28-55	C	10YR56	75YR58	C	F		S	0	0	SLST	3		M		Y		
	55-90	C	25Y 62	10YR58	M	D		Y	0	0	SLST	10		P		Y	Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED		-----STONES-----			STRUCT/		SUBS		CALC
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	
51	0-28	HCL	10YR43						0	0	HR	3				
	28-50	C	10YR54	10YR56	C	F		S	0	0		0		M		Y
	50-80	C	05Y 62	10YR58	M	D		Y	0	0	SLST	5		P		Y Y
53	0-25	C	10YR32						0	0		0				
	25-50	C	10YR53				FEW MN		0	0		0		M		
	50-80	C	25Y 61	10YR68	C	D		Y	0	0	SLST	10		P		Y Y
54	0-25	HCL	10YR4243						0	0	HR	4				
	25-40	C	25Y 5253	10YR56	C	D		Y	0	0	SLST	2		P		Y Y
	40-80	C	05Y 6272	10YR5658	M	D		Y	0	0	SLST	5		P		Y Y
55	0-30	MCL	10YR4243						4	0	HR	10				Y
	30-35	HCL	10YR44						0	0	HR	10		M		Y IMP 35 LSTONE
56	0-30	MCL	10YR43						12	8	HR	20				Y
	30-42	SCL	10YR4454						0	0	FSST	30		M		Y IMP 42 LSTONE
57	0-22	C	10YR33						0	0		0				
	22-45	C	10YR53						0	0		0		M		
	45-65	C	25Y 6253	10YR68	C	D		Y	0	0	SLST	5		P		Y Y
	65-90	C	25Y 61	10YR68	C	D		Y	0	0	SLST	10		P		Y Y
59	0-25	HCL	10YR424						0	0	HR	5		M		
	25-39	C	10YR5253	10YR5658	C	D		Y	0	0	SLST	2		P		Y Y
	39-70	C	05Y 5262	10YR5658	M	D		Y	0	0	SLST	5		P		Y Y
60	0-30	HCL	10YR4243						0	0	HR	5				Y
	30-40	C	10YR54						0	0	SLST	10		M		Y +5% HR
	40-55	HCL	25Y 73						0	0	SLST	10		M		Y +5% HR IMP 55
61	0-22	C	10YR43						1	0	HR	8				Y
	22-35	C	10YR46						0	0	HR	10		M		Y IMP 35 LSTONE
62	0-30	HCL	10YR4243						0	0	HR	4				
	30-41	C	10YR5354						0	0	HR	5		M		
	41-75	C	25Y 5262	10YR5658	M	D		Y	0	0	SLST	5		P		Y Y PLASTIC
63	0-25	HCL	10YR44						0	0	HR	3				Y 5P LOCATION
	25-42	C	75YR4446						0	0	HR	10		M		Y
64	0-19	HCL	10YR44						2	0	HR	10				Y IMP 19 LSTONE
65	0-25	C	10YR3343						0	0	SLST	3				
	25-50	C	10YR5354	10YR56	F	F	FEW MN		0	0		0		M		
	50-80	C	25Y 62	10YR68	C	D		Y	0	0	SLST	10		P		Y Y
66	0-25	HCL	10YR44						0	0		0				Y
	25-36	C	10YR64	10YR56	C	F	FEW MN	Y	0	0		0		P		Y Y
	36-60	C	25Y 62	25Y66	C	D	FEW MN	Y	0	0		0		P		Y Y

SAMPLE	DEPTH	TEXTURE	COLOUR	---MOTTLES---			PED	---STONES---			STRUCT/	SUBS	SPL	CALC	
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT			CONSIST
67	0-28	HCL	10YR43					12	7	HR	20			Y	
	28-30	C	10YR46					0	0	HR	50	M		Y IMP 30 LSTONE	
68	0-28	HCL	10YR43					2	0	HR	10				
	28-60	C	10YR54	10YR56	C	F		S	0	0	HR	10	P	Y	
	60-120	C	25Y 52	10YR58	M	F		Y	0	0	SLST	5	P	Y Y	
69	0-28	HCL	10YR44					3	0	HR	10			Y SEE 3P	
	28-55	C	10YR46					0	0	HR	25	M		Y +10%SLST IMP55	
70	0-28	HCL	10YR43					3	0	HR	10				
	28-35	C	10YR46					0	0	HR	50	M		Y IMP 35 LSTONE	
1P	0-28	HCL	10YR43					3	0	HR	8			Y	
	28-40	C	10YR44					0	0	HR	12	MDCSAB	FR M	Y	
	40-55	C	10YR44					0	0	HR	55		M	Y	
	55-65	HR						0	0		0		P	Y PIT IMP 65	
2P	0-25	HCL	10YR42					0	0	HR	2				
	25-39	C	10YR5363					0	0		0	MDCAB	FR M		
	39-49	C	25Y 54	10YR58	C	D		Y	0	0		0	MDCAB	FM P	Y Y
	49-80	C	25Y 61	10YR58	M	D		Y	0	0		0	WKCAB	FM P	Y Y PIT TO 80
3P	0-22	HCL	10YR32					1	0	HR	3			Y	
	22-32	C	10YR44					0	0	HR	10	MDCSAB	FR M	Y	
	32-74	C	75YR46					0	0	HR	25	MDCSAB	FM M	Y	
	74-82	C	10YR66					0	0	HR	55		M	Y PIT TO 82	
4P	0-16	C	10YR44					10	6	HR	20			Y	
	16-38	C	10YR46					0	0	HR	63		FR M	Y	
	38-44	HR	10YR6483					0	0		0		VM P	Y IMP44 ROOTS42	
5P	0-23	HCL	10YR44					2	0	HR	12			Y	
	23-42	C	75YR4446					0	0	HR	13	MDCSAB	FR M	Y	
	42-65	C	75YR4446					0	0	HR	53		M	Y	
	65-70	HCL	25Y 64					0	0	HR	60		M	PIT IMP 70	
6P	0-23	HCL	10YR32					0	0		0			AT BORING 23	
	23-46	C	10YR4454				25Y 52	0	0		0	MDCAB	FR M	Y	
	46-80	C	25Y 62	10YR68	M	D		Y	0	0	SLST	3	MDCAB	FM P	Y Y Y