A1

Milton Keynes Local Plan
Potential Development Area 4 (N)

Agricultural Land Classification
Semi-Detailed Survey
ALC Map and Report

June 1997

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

MILTON KEYNES LOCAL PLAN, POTENTIAL DEVELOPMENT AREA 4 (N)

SEMI-DETAILED SURVEY

INTRODUCTION

1. This report presents the findings of a semi-detailed Agricultural Land Classification (ALC) survey of approximately 88 hectares of land north of Wavendon, to the east of Milton Keynes. The survey was carried out in June 1997.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA) on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with its statutory input to the Milton Keynes Local Plan. The results of this survey supersede any previous ALC information for this land.

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

4. At the time of survey the land was in permanent grass, sometimes being grazed by sheep or cereals. Areas of the site mapped as 'Other Land' comprise dwellings and farm buildings associated with Glebe Farm, and areas of newly planted woodland. Parts of the site were not surveyed since permission to enter the land was not obtained.

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	7.3	10.2	8.4
3b	64.1	89.8	73.4
Not surveyed	8.9	N/A	10.2
Other land	7.0	N/A	8.0
Total surveyed area	71.4	100	N/A
Total site area	87.3	N/A	100

7. The fieldwork was conducted at an average density of 1 boring every 1.5 hectares of agricultural land surveyed. A total of 42 borings and 2 soil pits were described.

8. The agricultural land on this site has been assigned predominantly to Subgrade 3b, (moderate quality) with a small area of Subgrade 3a (good quality). Soils are derived mainly from Oxford Clay, which towards the south-west of the site is overlain by head or glacial Boulder Clay.

9. The land on this site has been classified on the basis of soil wetness/workability restrictions. Across most of the site, profiles comprise non-calcareous heavy clay loam topsoils over clayey subsoils which impede soil drainage. The combination of soil drainage status and the heavy topsoils causes significant soil wetness/workability problems, such that the flexibility of cropping and the opportunities for cultivations or grazing will be limited. A small area of better quality land towards the south of the site equates to slightly higher land where soils are less clayey and thereby better drained.

FACTORS INFLUENCING ALC GRADE

CLIMATE

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

11. 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

Factors	Units	Values	Values	Values
Grid reference	N/A	SP 911 379	SP 919 378	SP 911 374
Altitude	m.AOD	70	75	80
Accumulated Temperature	day°C	1410	1404	1399
Average Annual Rainfall	mm	618	616	620
Field Capacity Days	days	126	126	127
Moisture Deficit, Wheat	mm	110	110	109
Moisture Deficit, Potatoes	mm	103	102	101
Overall Climatic Grade	N/A	Grade 1	Grade 1	Grade 1

12. 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.

13. 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 (ATO, January to June), as a measure of the relative warmth of a locality. The figures above suggest that overall, the site is comparatively cool and dry (in regional terms).

14. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Other local climatic factors such as exposure and frost risk are not

believed to have a significant adverse effect on the site. The site is climatically Grade 1. The site is relatively cool and dry in regional and national terms.

SITE

15. The agricultural land at this site lies at an altitude of 65-95m AOD. The majority of the land at the site is gently sloping (falling from the south to the north) with slight undulations. Nowhere does gradient or microrelief affect agricultural land quality.

GEOLOGY AND SOILS

16. The published geological information for the site (BGS, 1992) shows the majority of the site to be underlain by Oxford Clay. A small area of head and boulder clay is mapped along the southern boundary of the western side of the site

17. The most recently published soil information for the site (SSEW, 1983) shows the Evesham 2 association to cover the eastern part of the site. The Hanslope association is mapped in the western side of the site. The former soils are 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 associated irregular terrain locally.' (SSEW, 1983). The latter soil types are described as 'slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous soils. Slight risk of water erosion.' (SSEW,1983).

18. Upon detailed field examination, soils consistent with the above descriptions were found to exist across the site.

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.

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. A small area of good quality land has been mapped across the higher land in the south-west corner of the site where soil wetness is the main limitation.

22. Soil profiles within this unit are variable in nature but generally comprise a combination of calcareous and non-calcareous, medium and heavy clay loam topsoils which are stoneless or very slightly stony (1-2% total flints) overlying similar upper subsoils. These upper horizons are loose and friable and tend to contain differing amounts of sand fraction. At variable depths, calcareous, plastic clay lower subsoils occur in most profiles which are gleyed and slowly permeable between 42cm and 60cm. Very occasional profiles within this unit are however much sandier and more porous and therefore better drained. All profiles are gleyed at shallow to moderate depths (20-45cm) and depending on the existence and depth of the clay, the soil profiles have slight or moderately impeded drainage. A wetness class of II or III

is therefore considered appropriate for these soils. The interaction between the soil drainage status and the climatic conditions results in a wetness limitation which will restrict the utilisation of the land. Prolonged seasonal waterlogging will affect crop growth especially seed germination and root development.

Subgrade 3b

23. The remainder of the site has been mapped as Subgrade 3b. This land is also limited by soil wetness but to a greater degree than described previously.

24. Within this unit, the majority of profiles have slightly stony (1-5% total flint), non calcareous heavy clay loam or occasionally clay topsoils. Some profiles have shallow upper subsoil horizons which have similar characteristics to the topsoils and tend to be moderately structured (especially when they contain sandy material). On the whole, the topsoils lie directly over denser, more plastic, calcareous clay subsoils (typically within 35cm or less of the surface). The soil inspection pits 1 and 2 (see appendix II) reveal this denser clay to be poorly structured and slowly permeable. As a result, soil drainage will be impeded to the extent that wetness class III is appropriate, which when combined with local climatic conditions and heavy topsoil textures, gives rise to a land classification of Subgrade 3b on the basis of soil wetness and workability. The heavy topsoil textures will restrict the timing of cultivations as trafficking by agricultural machinery or grazing by livestock may lead to structural damage. Very occasional borings within the Subgrade 3b unit were impenetrable to the auger at moderate depths where more stony horizons occur but were too few and far between to be mapped separately.

Sharron Cauldwell
Resource Planning Team
Eastern Region
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1992) Sheet No. 220, Leighton Buzzard 1:63,360 scale (Drift Edition). 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

DESCRIPTION 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 that 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 (eg. 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 that restricts 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 descriptions

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				

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 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

SOIL PIT DESCRIPTION

Site Name : MILTON KEYNES UDP AREA 4 Pit Number : 1P

Grid Reference: SP90903760 Average Annual Rainfall : 623 mm
Accumulated Temperature : 1408 degree days
Field Capacity Level : 126 days
Land Use : Permanent Grass
Slope and Aspect : 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	HCL	25Y 42 00	0	5	HR					
25- 40	HCL	25Y 53 00	0	5	HR	C	MVCSAB	VM	M	Y
40- 70	C	10YR51 61	0	2	SLST	M	MDVCPR	VM	P	Y
70-120	C	05Y 51 00	0	2	SLST	M	WDCSAB	VM	P	Y

Wetness Grade : 3B Wetness Class : III
Gleying :025 cm
SPL :040 cm

Drought Grade : 2 APW : 127mm MBW : 17 mm
APP : 104mm MBP : 1 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : MILTON KEYNES UDP AREA 4 Pit Number : 2P

Grid Reference: SP91703820 Average Annual Rainfall : 623 mm
Accumulated Temperature : 1408 degree days
Field Capacity Level : 126 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 33	HCL	10YR42 00	0	3	HR	C				
33- 49	C	25 Y53 00	0	3	HR	M	MDVCAB	FM	P	
49- 62	C	10YR61 00	0	6	HR	M	WKCAB	FM	P	
62- 85	C	05 Y61 62	0	4	HR	M	MDCAB	VM	P	Y

Wetness Grade : 3B Wetness Class : III
Gleying : 0 cm
SPL :033 cm

Drought Grade : APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	--WETNESS-- GLEY SPL	CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
1	SP91703820	PGR			0 028	3	3B	000	0	000	0					WE	3B	SEE 2P
1P	SP90903760	PGR	N	01	025 040	3	3B	127	17	104	1	2				WE	3B	
2	SP91803820	WHT			0 050	3	3B	000	0	000	0					WE	3B	SEE 2P
2P	SP91703820	PGR			0 033	3	3B	000	0	000	0					WE	3B	
3	SP91903820	WHT			030 030	3	3B	000	0	000	0					WE	3B	SEE 2P
4	SP91303810	PGR			030 030	3	3B	000	0	000	0					WE	3B	SEE 2P
5	SP91403810	PGR			028 035	3	3B	101	-9	105	2	3A				WE	3B	IMP 75
6	SP91603810	PGR			025 038	3	3B	000	0	000	0					WE	3B	SEE 2P
7	SP91803810	WHT			030 030	3	3B	000	0	000	0					WE	3B	IMP 55 FLINT
8	SP91103800	PGR	SW	01	030 047	3	3B	000	0	000	0					WE	3B	SEE 1P
9	SP91303800	PGR			035 035	3	3B	119	9	107	4	2				WE	3B	IMP 100 FLINT
10	SP91503800	PLO			0 035	3	3B	107	-3	105	2	3A				WE	3B	SEE 1P
11	SP91703800	PLO			028 028	3	3B	102	-8	104	1	3A				WE	3B	SEE 2P
12	SP91903800	WHT			030 030	3	3B	000	0	000	0					WE	3B	IMP 65
13	SP91003790	PGR			0 028	3	3B	000	0	000	0					WE	3B	SEE 1P
14	SP91203790	PGR	W	01	0 030	3	3B	000	0	000	0					WE	3B	SEE 2P
15	SP91403790	PGR			020	2	3A	077	-33	080	-23	3B				WE	3A	IMP 55
16	SP91603790	PLO			025 025	3	3B	124	14	101	-2	2				WE	3B	SEE 2P
17	SP91803790	PLO			025 025	3	3B	104	-6	102	-1	3A				WE	3B	SEE 2P
18	SP90803780	WHT			030 055	3	3B	000	0	000	0					WE	3B	SEE 1P
19	SP91103780	LEY			025 025	3	3B	000	0	000	0					WE	3B	SEE 2P
20	SP91303780	PGR			0 030	3	3B	117	7	104	1	2				WE	3B	
21	SP91503780	PLO			030 030	3	3B	085	-25	091	-12	3B				WE	3B	SEE 2P
22	SP91703780	PLO			0 028	3	3B	098	-12	103	0	3A				WE	3B	SEE 2P
23	SP91903780	HAY			032 032	3	3B	000	0	000	0					WE	3B	SEE 2P
24	SP90803770	WHT			030 045	3	3B	000	0	000	0					WE	3B	SEE 1P
25	SP90903770	RGR			035 035	3	3B	127	17	104	1	2				WE	3B	SEE 1P
26	SP91203770	PGR			028 028	3	3B	126	16	103	0	2				WE	3B	SEE 1P
27	SP91403770	PGR			025 025	3	3A	100	-10	104	1	3A				WE	3A	CALC T/S
28	SP91603770	PLO	NE	01	028 028	3	3B	000	0	000	0					WE	3B	SEE 2P
29	SP90703760	PGR	N	01	032 045	3	3B	000	0	000	0					WE	3B	SEE 1P
30	SP90903760	OAT	N	01	030 048	3	3B	000	0	000	0					WE	3B	SEE 1P
31	SP91083760	LEY			028 055	3	3B	126	16	102	-1	2				WE	3B	SEE 1P
32	SP91303760	PGR			055 055	2	3A	103	-7	109	6	3A				WE	3A	SEE 1P
33	SP91603760	PLO	NE	01	030 030	3	3B	000	0	000	0					WE	3B	
34	SP90803750	PGR	N	01	025 040	3	3B	129	19	106	3	2				WE	3B	SEE 1P
35	SP91403760	PGR			0 028	3	3B	000	0	000	0					WE	3B	SEE 2P
36	SP90703740	PGR	N	02	020 048	3	3A	131	21	108	5	2				WE	3A	SEE 1P
37	SP90903740	PGR	N	02	042 042	2	2	090	-20	096	-7	3B				WE	2	BORDER 3A
38	SP90803730	PGR	N	03	078	1	1	144	34	113	10	1					1	SL GL 30
39	SP91003750	PGR	NE		045 045	2	3A	000	0	000	0					WE	3A	SEE 1P
40	SP91203750	PGR			025 038	3	3B	000	0	000	0					WE	3B	SEE 1P

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
41	SP91103740	PGR	NE	02	025	025	3	3A	000	0	000	0					WE	3A	SEE 1P
42	SP91303740	PGR	N	02	025	025	3	3B	000	0	000	0					WE	3B	SEE 1P

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
1	0-28	hcl	10YR33 00	75YR46 00	C			Y	0	0	HR	2							
	28-68	c	10YR52 53	10YR58 00	C			Y	0	0		0		P			Y		
	68-90	c	25 Y62 71	75YR58 00	M			Y	0	0		0		P			Y	Y	
1P	0-25	hcl	25Y 42 00						0	0	HR	5							
	25-40	hcl	25Y 53 00	10YR56 00	C		00MN00 00	Y	0	0	HR	5	MVCSAB VM	M				Y	MIXED S AND C
	40-70	c	10YR51 61	10YR58 00	M		00MN00 00	Y	0	0	SLST	2	MDVCPR VM	P	Y		Y	Y	PLASTIC
	70-120	c	05Y 51 00	10YR58 00	M		00MN00 00	Y	0	0	SLST	2	WDCSAB VM	P	Y		Y	Y	VERY FIRM
2	0-30	hcl	25 Y43 00	75YR46 00	C			Y	0	0	HR	1							
	30-50	c	10YR53 00	10YR58 00	C			Y	0	0	HR	5		M					SANDY, LOOSE
	50-80	c	25 Y53 63	10YR58 00	C			Y	0	0		0		P			Y	Y	DENSE
2P	0-33	hcl	10YR42 00	10YR58 00	C			Y	0	0	HR	3							
	33-49	c	25 Y53 00	75YR58 00	M			Y	0	0	HR	3	MDVCAB FM	P	Y		Y		SANDY, DENSE
	49-62	c	10YR61 00	75YR68 00	M		00MN00 00	Y	0	0	HR	6	WKCAB FM	P	Y		Y		SANDY, DENSE
	62-85	c	05 Y61 62	10YR58 00	M			Y	0	0	HR	4	MDCAB VM	P	Y		Y	Y	PLASTIC
3	0-30	hcl	25 Y43 00						0	0		0							
	30-50	c	10YR53 00	75YR58 00	C			Y	0	0	HR	2		P			Y		
	50-75	c	25 Y62 00	10YR58 00	C			Y	0	0		0		P			Y	Y	
4	0-30	hcl	10YR43 53						0	0	HR	2							
	30-50	c	10YR53 00	10YR58 00	C			Y	0	0	HR	5		P			Y		GRITTY, DENSE
	50-70	c	25 Y61 00	10YR58 00	M			Y	0	0	HR	2		P			Y	Y	PLASTIC
5	0-28	hcl	10YR32 00						0	0	HR	2							
	28-35	c	10YR53 00	10YR58 00	C			Y	0	0	HR	10		M					SANDY, LOOSE
	35-60	sc	10YR53 00	75YR58 00	M			Y	0	0	HR	5		P			Y		DENSE
	60-65	scl	10YR58 00					Y	0	0	HR	5		M					
	65-75	msl	10YR58 00					Y	0	0	HR	5		M					IMP GRAVELLY
6	0-25	hcl	25 Y33 00						0	0	HR	1							
	25-38	c	25 Y43 00	10YR58 00	C			S	0	0		0		M					SANDY, LOOSE
	38-58	c	25 Y64 66	10YR68 00	C			S	0	0		0		P			Y	Y	SANDY, DENSE
	58-90	c	25 Y62 00	10YR56 00	M			Y	0	0		0		P			Y	Y	PLASTIC
7	0-30	hcl	25 Y43 00						0	0		0							
	30-55	c	10YR53 00	10YR58 00	C			Y	0	0	HR	5		P			Y		IMP, FLINT
8	0-30	hcl	10YR42 00						0	0		0							
	30-47	c	10YR53 00	10YR58 00	C			Y	0	0		0		M					LOOSE, SANDY
	47-67	c	25 Y53 00	10YR58 00	C			Y	0	0		0		P			Y	Y	PLASTIC
	67-90	c	25 Y61 00	10YR58 00	C			Y	0	0		0		P			Y	Y	
9	0-35	hcl	10YR42 00						0	0	HR	2							
	35-70	c	05Y 62 00	10YR66 00	C			Y	0	0	SLST	2		P			Y	Y	V.FIRM, DENSE
	70-100	sc	05Y 62 00	75YR58 00	M			Y	0	0		0		P			Y	Y	IMP, FLINTS

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
10	0-25	hcl	25Y 42 52	10YR58	00	C		Y	0	0	HR	1							
	25-35	hcl	25Y 62 00	75YR68	00	C		Y	0	0	HR	2		M					LOOSE
	35-90	c	25Y 62 00	75YR68	00	C	00MN00	00 Y	0	0	HR	2		P		Y			PLASTIC
11	0-28	hcl	10YR42	00					0	0	HR	3							
	28-40	c	25Y 52 53	10YR46	00	C		Y	0	0		0		P		Y			FIRM
	40-65	c	25Y 62 63	10YR58	00	C	00MN00	00 Y	0	0		0		P		Y			PLASTIC
	65-85	c	05Y 62 00	10YR68	00	C		Y	0	0		0		P		Y	Y		FIRM
12	0-30	hcl	25 Y43 00						0	0		0							
	30-65	c	10YR53 00	10YR58	00	C		Y	0	0	HR	2		P		Y			IMP,FLINT
13	0-28	hcl	10YR42 00	10YR56	00	C		Y	0	0		0							
	28-60	c	25 Y53 54	10YR58	00	C	00MN00	00 Y	0	0		0		P		Y			PLASTIC
	60-80	c	25 Y62 71	10YR56	00	C		Y	0	0		0		P		Y	Y		PLASTIC
14	0-30	hcl	10YR42 00	10YR56	00	C		Y	0	0		0							
	30-50	c	25YR53 00	10YR58	00	C		Y	0	0		0		P		Y			SANDY, DENSE
	50-58	c	10YR53 00	75YR58	00	C		Y	0	0		0		P		Y	Y		PLASTIC
	58-80	c	25 Y62 00	10YR56	00	C		Y	0	0		0		P		Y	Y		PLASTIC
15	0-20	hcl	10YR42 00						0	0	HR	2							
	20-48	c	25Y 62 00	10YR68	00	C		Y	0	0	SLST	2		P			Y		DENSE
	48-55	c	25Y 62 00	10YR68	00	C		Y	0	0	HR	20		M			Y		IMP, FLINTS
16	0-25	hcl	10YR42 00						1	0	HR	3							
	25-58	c	25Y 61 00	10YR68	00	C	00MN00	00 Y	0	0	HR	2		P		Y			FIRM
	58-120	c	05Y 61 00	10YR68	00	C		Y	0	0	SLST	2		P		Y			PLASTIC
17	0-25	hcl	10YR42 00						0	0	HR	2							
	25-70	c	25Y 62 00	10YR68	00	C		Y	0	0	HR	2		P		Y			FIRM
	70-90	c	05 Y62 00	75YR68	00	M	00MN00	00 Y	0	0	HR	2		P		Y			DENSE
18	0-30	hcl	10YR43 00						0	0		0							
	30-55	c	10YR53 00	10YR58	00	C		Y	0	0		0		M					SL SANDY
	55-80	c	10YR53 52	75YR58	00	M		Y	0	0		0		P		Y			GRITTY, LOOSE
	80-100	c	25 Y62 61	75YR58	00	M		Y	0	0		0		P		Y	Y		PLASTIC
19	0-25	hcl	10YR52 00						0	0		0							
	25-35	c	25 Y53	10YR56	00	C		Y	0	0		0		P		Y	Y		DENSE
	35-70	c	25 Y63 71	10YR56	00	M		Y	0	0		0		P		Y	Y		PLASTIC
20	0-30	hcl	25Y 52 00	75YR58	00	C		Y	0	0	HR	2							
	30-75	c	25Y 62 00	10YR68	00	C		Y	0	0	SLST	2		P		Y	Y		PLASTIC
	75-90	mzcl	05Y 71 00	10YR58	00	C		Y	0	0	SLST	5		M			Y		LOOSE, SOFT
	90-100	c	05Y 51 62	10YR58	00	M		Y	0	0		0		P		Y	Y		PLASTIC
21	0-30	c	10YR41 31	10YR46	00	F			0	0	HR	3							
	30-40	c	25Y 52 61	10YR56	00	C		Y	0	0	HR	2		P		Y			DENSE, FIRM
	40-60	c	05Y 52 61	10YR58	00	M	00MN00	00 Y	0	0	SLST	3		P		Y	Y		PLASTIC

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
22	0-28	hcl	10YR52 00	10YR58 00	C			Y	1	0	HR	3						
	28-60	c	25Y 61 00	10YR68 00	C			Y	0	0	HR	2		P		Y		FIRM
	60-80	c	05Y 61 00	10YR66 00	C			Y	0	0	SLST	2		P		Y		PLASTIC
23	0-32	c	25 Y43 00						0	0		0						
	32-70	c	25 Y53 00	10YR58 00	C			Y	0	0		0		P		Y	Y	PLASTIC
24	0-30	hcl	10YR43 00						0	0		0						
	30-45	c	10YR53 00	10YR58 00	C			Y	0	0		0		M				GRITTY, LOOSE
	45-90	c	25 Y53 00	10YR58 00	M		25 Y61 00	Y	0	0		0		P		Y	Y	PLASTIC
25	0-25	hcl	10YR31 00						0	0	HR	3						
	25-35	c	10YR53 00	10YR56 00	F		00MN00 00		0	0	HR	1		M				LOOSE
	35-80	c	10YR52 53	10YR56 58	M		00MN00 00	Y	0	0	HR	2		P		Y		PLASTIC
	80-120	c	10YR61 71	10YR58 00	M			Y	0	0		0		P		Y		PLASTIC
26	0-28	hcl	10YR42 00						0	0		0						
	28-50	c	25Y 51 53	10YR56 58	M		00MN00 00	Y	0	0	HR	5		P		Y	Y	PLASTIC
	50-120	c	05Y 61 62	10YR56 58	M		00MN00 00	Y	0	0	SLST	2		P		Y	Y	PLASTIC
27	0-25	hcl	10YR42 00						0	0		0					Y	
	25-45	c	25Y 52 53	10YR66 68	M		00MN00 00	Y	0	0		0		P		Y	Y	
	45-82	c	05Y 61 62	10YR58 00	M			Y	0	0		0		P		Y	Y	
28	0-28	hcl	10YR31 41	10YR46 00	F				0	0	HR	3						
	28-40	c	25Y 52 61	10YR56 00	C			Y	0	0	SLST	2		P		Y		DENSE
	40-70	c	05Y 61 52	10YR56 58	M		00MN00 00	Y	0	0		0		P		Y	Y	PLASTIC
29	0-32	hcl	10YR43 00						0	0		0						
	32-45	c	10YR43 53	10YR58 00	C			Y	0	0		0		M				LOOSE, SANDY
	45-75	c	10YR52 00	75YR58 00	C			Y	0	0		0		P		Y		PLASTIC
	75-100	c	10YR71 00	75YR68 00	M			Y	0	0		0		P		Y	Y	PLASTIC
30	0-30	hcl	10YR43 53						0	0		0						
	30-48	hcl	10YR53 00	10YR58 00	C			Y	0	0		0		M				LOOSE, SANDY
	48-75	c	25 Y63 64	10YR58 00	C			Y	0	0		0		P		Y		PLASTIC
	75-100	c	25 Y71 00	10YR68 00	M			Y	0	0		0		P		Y	Y	PLASTIC
31	0-28	hcl	10YR42 00						0	0	HR	2						
	28-55	hcl	10YR52 53	10YR46 56	C		00FE00 00	Y	0	0	HR	3		M				WITH MS LOOSE
	55-75	c	10YR53 63	10YR56 58	M		00MN00 00	Y	0	0	HR	5		P		Y		PLASTIC
	75-120	c	10YR61 52	10YR58 00	M		00MN00 00	Y	0	0		0		P		Y	Y	PLASTIC
32	0-25	hcl	10YR42 00						0	0	HR	2						
	25-55	c	10YR53 00	10YR56 00	F				0	0	HR	5		M				WITH MS
	55-70	c	25Y 52 53	10YR56 00	C		00MN00 00	Y	0	0	HR	2		P		Y	Y	PLASTIC
	70-80	c	05Y 52 53	10YR58 00	M		00MN00 00	Y	0	0	SLST	2		P		Y	Y	

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC	
33	0-30	hcl	25Y 42 00						0	0	HR	3					Y		
	30-55	c	25Y 52 61	10YR56 00	C			Y	0	0	HR	2		P		Y	Y		DENSE
	55-70	c	05Y 51 52	10YR56 58	M		00MN00 00	Y	0	0	SLST	2		P		Y	Y		PLASTIC
34	0-25	hcl	25Y 52 00						0	0	HR	2							
	25-40	c	25Y 53 00	75YR58 00	C			Y	0	0	HR	2		M			Y		CRUMBLY
	40-68	c	25Y 62 63	10YR68 00	C			Y	0	0	SLST	2		P		Y	Y		V FIRM
	68-75	c	10YR62 00	75YR58 00	C			Y	0	0	SLST	5		P		Y	Y		PLASTIC
	75-120	c	25Y 51 00	10YR58 00	M			Y	0	0		0		P		Y	Y		
35	0-28	hcl	10YR42 00	10YR58 00	C			Y	0	0	HR	2							
	28-45	c	25 Y63 00	10YR68 00	C			Y	0	0	HR	2		P		Y			DENSE, FIRM
	45-80	c	05 Y62 00	10YR66 00	M		00MN00 00	Y	0	0		0		P		Y			PLASTIC
36	0-20	mcl	10YR43 00						0	0	HR	2							
	20-30	hcl	10YR53 00	75YR58 00	C			Y	0	0	HR	2		M					WITH MS
	30-48	hcl	10YR63 00	75YR58 00	C		00MN00 00	Y	0	0	HR	2		M					FRIABLE
	48-95	c	25Y 62 63	10YR68 00	C			Y	0	0		0		P		Y	Y		
	95-120	c	25Y 51 62	10YR66 00	C			Y	0	0		0		P		Y	Y		FIRM, DENSE
37	0-30	mcl	10YR42 00						0	0	HR	2							
	30-42	mcl	10YR53 00	10YR58 00	F				0	0		0		M					
	42-60	c	10YR52 53	10YR56 58	M		00MN00 00	Y	0	0		0		P		Y			DENSE, PLASTIC
38	0-30	mcl	10YR42 00						0	0	HR	2							
	30-40	mcl	10YR44 54	75YR58 00	C			S	0	0	HR	2		M					WITH MS
	40-65	scl	10YR54 00	75YR58 00	C			S	0	0	HR	2		M					LOOSE
	65-78	hcl	25Y 54 00	75YR58 00	C			S	0	0	HR	2		M					FRIABLE
	78-100	msl	25Y 64 00	75YR58 00	C			Y	0	0	HR	2		M					LOOSE
	100-120	lms	25Y 64 00	75YR58 00	C			Y	0	0	HR	2		M					
39	0-30	hcl	10YR43 00						0	0	HR	2							
	30-45	mcl	10YR54 53	10YR58 00	F				0	0	HR	2		M					LOOSE
	45-70	c	25Y 61 63	10YR58 00	C			Y	0	0	SLST	3		P		Y	Y		PLASTIC
40	0-25	hcl	10YR43 00						0	0	HR	2							
	25-38	hcl	10YR53 00	10YR58 00	C			Y	0	0	HR	2		M					LOOSE
	38-60	c	25Y 53 52	10YR58 00	M			Y	0	0	HR	2		P		Y			PLASTIC
41	0-25	mcl	10YR43 00						0	0	HR	2							
	25-60	c	25Y 61 63	10YR58 00	C			Y	0	0	SLST	2		P		Y	Y		PLASTIC
42	0-25	hcl	10YR43 00						0	0	HR	2							
	25-40	c	25Y 61 63	10YR56 00	C			Y	0	0	SLST	2		P		Y	Y		DENSE, FIRM
	40-60	c	25Y 61 63	10YR56 00	C			Y	0	0		0		P		Y	Y		PLASTIC