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CHAPMANS FARM NEAR UPMINSTER
LONDON BOROUGH OF HAVERING

Agricultural Land Classification
ALC Map and Report

January 1998

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT
CHAPMANS FARM NEAR UPMINSTER
LONDON BOROUGH OF HAVERING

INTRODUCTION

1 This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on approximately 25 8 hectares of land on the north west edge of Upminster in the London Borough of Havering The survey was carried out during January 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 a planning application for a nine hole golf course 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 was under grass and cereals Two relatively small areas on the mid slopes towards the east of the site were under strawberries Along the eastern site boundary agricultural buildings and scrub have been mapped as Other Land

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 below

Table 1 Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	7 2	25 5	25 3
3b	17 9	63 5	62 8
4	3 1	11 0	10 9
Other land	0 3	N/A	1 0
Total surveyed area	28 2	100 0	
Total site area	28 5		100 0

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

7 The fieldwork was conducted at an average density of one boring per hectare A total of 31 borings and two soil inspection pits was described

8 In the east of the site the higher land adjacent to Chapmans Farm has been classified as Subgrade 3a (good quality) Much of the remaining land has been classified as Subgrade 3b (moderate quality) though the lower lying land along the western site boundary has been classified as Grade 4 (poor quality)

9 All of the land on the site suffers from soil wetness problems to varying degrees Soil wetness acts to restrict the flexibility of cropping stocking and cultivations and adversely affects yields On the higher land around Chapmans Farm the topsoils are medium textured These overlie permeable upper subsoils and pass into poorly structured clays which act to impede soil drainage At this very dry locality this land is classified as Subgrade 3a Across much of the remaining land the land is classified as Subgrade 3b because of soil wetness Here the profiles are similar or have clay directly below the topsoil However heavier topsoils across this area means that the ensuing soil wetness limitation is slightly more severe A small area in the west of the site is classified as Subgrade 3b because of a gradient limitation caused by relatively steep slopes

10 Around Chapmans Farm the interaction between the soil characteristics and the very dry local climate means that this land is also equally limited by soil droughtiness to Subgrade 3a Soil droughtiness may cause the level and consistency of crop yields to be reduced and restrict the range of cops which can tolerate droughty conditions

11 Along the western site boundary the land is flatter and lower lying Flooding is believed to occur once or twice a year for up to a week each time This risk of flooding severely restricts that range of crops which could be grown and consequently this land is classified as Grade 4

FACTORS INFLUENCING ALC GRADE

Climate

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

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

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

15 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR) as a measure of overall wetness and accumulated temperature (AT0 January to June) as a measure of the relative warmth of a locality

Table 2 Climatic and altitude data

	Units	Values	
Grid Reference	N/A	TQ 561 885	TQ 565 885
Altitude	m AOD	20	40
Accumulated Temperature	day C (Jan June)	1474	1451
Average Annual Rainfall	mm	597	601
Field Capacity Days	days	110	110
Moisture Deficit Wheat	mm	121	119
Moisture Deficit Potatoes	mm	118	115
Overall climatic grade	N/A	Grade 1	Grade 1

16 The combination of rainfall and accumulated temperature at this site mean that there is no overall climatic limitation However climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations At this locality the climate is very dry in national terms As a result the likelihood of soil droughtiness problems may be increased whereas soil wetness problems may be lessened No local climatic factors such as exposure or frost risk are believed to adversely affect the land quality on the site This site is climatically Grade 1

Site

17 The site rises from the stream that forms its western boundary up to Chapmans Farm in the east The land rises from approximately 15 m AOD in the west of the site to approximately 40 m AOD in the east of the site Gradients of over 7 occur over a small area in the western part of the site The lower lying land in the west of the site is subject to regular flooding

Geology and soils

18 The most detailed published geological information for the site (BGS 1976) shows the entire site to be underlain by a solid deposit of London Clay In places drift deposits overlie this such that a relatively large area in the east of the site on the higher land is overlain by boulder clay Brickearth deposits are shown to the immediate east and north east of the site A very small area along the southern site boundary is shown to be overlain by Boyn Hill gravel The lower lying land along the western site boundary is mapped as alluvium

19 The most recent detailed published soil map for this area (SSEW 1983 and 1984) maps the Windsor Association across the entire site These soils are described as Slowly permeable seasonally waterlogged clayey soils mostly with brown subsoils Some fine loamy over clayey and fine silty over clayey soils and locally on slopes clayey soils with only slight seasonal waterlogging (SSEW 1983) Soils similar to this description were found across the site

AGRICULTURAL LAND CLASSIFICATION

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

21 The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II page 9

Subgrade 3a

22 The slightly higher land in the east of the site has been classified as Subgrade 3a (good quality) The key limitations are soil wetness and droughtiness which act equally to restrict land quality across most of this area Discrete areas of this mapping unit are limited by soil wetness alone

23 Soil profiles typically comprise medium clay loam topsoils which either pass into permeable heavy clay loam upper subsoils or pass directly into poorly structured clay upper subsoils Where the former occur these profiles overlie clay subsoils from about 45 50 cm depth In most of these profiles the clay extends to at least 120 cm depth in some profiles however the lower subsoils become lighter in texture (sandy clay loams medium sandy loams) from about 80 cm depth These profiles tend to be (very) slightly stony throughout with topsoils and subsoils containing 0 8% total flints by volume Pit 2 typifies such soils

24 The clay subsoils are poorly structured and slowly permeable and as such act to impede soil drainage This is indicated by gleying at shallow to moderate depths (22 45 cm) within the soil profile The very dry prevailing climate means that these profiles are assessed as imperfectly drained (Wetness Class III) even where the clay occurs directly below the topsoil The interaction between these soil drainage characteristics the medium topsoils and the dry prevailing climate results in a soil wetness limitation consistent with Subgrade 3b Consequently this land will have some restrictions on the flexibility of cropping stocking and cultivations

25 In addition this land is also equally limited to Subgrade 3a by soil droughtiness Poorly structured clay subsoils release relatively little water for uptake by crop roots Consequently at this very dry locality the combination of soil textures subsoil structures and stone contents acts to make these soils drought prone As a result this land may be subject to lower and less consistent crop yields Discrete areas of this mapping unit are limited by soil wetness alone Here the soil profiles contain narrow clay subsoils and deep clay loam subsoils and thus have slightly more available water for uptake by crop roots

Subgrade 3b

26 Approximately two thirds of the agricultural land on the site has been classified as Subgrade 3b (moderate quality) All of this land is limited by significant soil wetness limitations Profiles typically comprise heavy clay loam and clay topsoils which directly overlie clay subsoils These clay subsoils are poorly structured and slowly permeable and act

to significantly impede soil drainage as indicated by gleying either from the surface or directly below the topsoil At this very dry climate these profiles are assessed as being imperfectly drained (Wetness Class III) However in comparison to land graded 3a the heavier topsoils further restrict the number of days when the land can be cultivated or grazed without causing damage to the soil structure Consequently at this locality Subgrade 3b is appropriate

27 A small area in the west of the site is also equally restricted to Subgrade 3b by a gradient limitation Here slopes in the range of 10 11° act to preclude some agricultural machinery from being safely and efficiently utilised

Grade 4

28 A narrow strip of land along the western site boundary has been classified as Grade 4 (poor quality) because of regular flooding from the Ingrebourne River This land is flat and low lying and occurs across an area approximate with the alluvial deposits The low lying nature of the land means that the flood waters are unable to quickly dissipate The floods tend to occur once or twice a year between late autumn and early spring for up to a week (personal communication) Land at risk from flooding is unsuitable for arable cropping both due to potential crop damage and the restrictions placed on the timings of cultivations Similarly flooded land cannot be used for grazing livestock throughout the year since it is unsafe and soil damage is likely to occur if the land is overstocked Consequently this land is only suitable for seasonal grazing in the drier months

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SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No 257 Romford 1 50 000 (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 1 250 000 scale Soils of South East England and accompanying legend*
SSEW Harpenden

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

APPENDIX I

DESCRIPTIONS OF THE GRADES AND SUBGRADES

Grade 1 Excellent Quality Agricultural Land

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

Grade 2 Very Good Quality Agricultural Land

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

Grade 3 Good to Moderate Quality Land

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

Subgrade 3a Good Quality Agricultural Land

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

Subgrade 3b Moderate Quality Agricultural Land

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

Grade 4 Poor Quality Agricultural Land

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

Grade 5 Very Poor Quality Agricultural Land

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

APPENDIX II

SOIL DATA

Contents

SOIL PROFILE DESCRIPTIONS EXPLANATORY NOTE

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

Boring Header Information

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

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

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

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

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

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

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

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

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

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

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

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

Soil Pits and Auger Borings

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

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

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

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

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

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

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

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

4 **MOTTLE CONT** Mottle contrast

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

15 Other notations

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

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WHEAT GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	ALC LIMIT	COMMENTS
1	TQ56008900	PGR	W	3	0	28	3	3B	124	3	102	16	3A	Y			FL 4	Flooding
2	TQ56108900	PGR	W	2	28	28	3	3B	123	2	99	19	3A				WE 3B	
3	TQ56208900	CER	W	2	30	30	3	3B	126	5	102	16	3A				WE 3B	
4	TQ56108890	PGR	W	3	0	28	3	3B	124	3	101	17	3A				WE 3B	
5	TQ56208890	CER	W	3	28	28	3	3B	124	3	102	16	3A				WE 3B	
6	TQ56308890	CER	W	3	30	30	3	3B	121	0	99	19	3A				WE 3B	
7	TQ56408890	CER	NW	3	28	45	3	3A	127	6	106	12	3A				WD 3A	
8	TQ56108880	PGR			22	22	3	3B	110	11	101	17	3A	Y			FL 4	Flooding
9	TQ56208880	CER	S	3	15	15	3	3B	121	0	98	20	3A				WE 3B	Shallow t/soil
10	TQ56308880	CER	SW	4	22	22	3	3A	122	1	99	19	3A				WD 3A	Shallow t/soil
11	TQ56408880	CER	SW	3	26	26	3	3A	136	15	99	19	3A				WD 3A	
12	TQ56108870	PGR	W	2	0	40	3	3B	131	10	108	10	3A	Y			FL 4	Flooding
13	TQ56208870	PGR	W	3	0	35	3	3B	127	6	104	14	3A				WE 3B	
14	TQ56308870	PGR	W	2	0	60	2	3A	105	16	110	8	3A				WE 3A	Impen 80 stony
15	TQ56408870	PGR	W	3	20	45	3	3A	129	8	106	12	3A				WD 3A	
16	TQ56488868	LEY	W	2	28		2	3A	153	32	115	3	2				WE 3A	
17	TQ56108860	CER	W	3	30	30	3	3B	111	10	102	16	3A				WE 3B	
18	TQ56208860	CER	SW	3	30	38	3	3B	115	6	106	12	3A				WE 3B	
19	TQ56308860	CER	SW	3	0	65	2	3A	109	1	99	19	3A				WD 3A	Deep topsoil
20	TQ56408860	FRT	SW	3	25	25	3	3B	98	9	89	29	3B				WE 3B	
21	TQ56508860	LEY	SW	3	27	45	3	3A	102	6	103	15	3A				WD 3A	
22	TQ56008850	PGR			30		2	3A	116	5	117	1	3A	Y			FL 4	Flooding Imp82
23	TQ56108850	PGR	S	4	28	28	3	3B	110	11	101	17	3A				WE 3B	
24	TQ56208850	PGR	S	3	28	28	3	3B	111	10	102	16	3A				WE 3B	
25	TQ56308850	CER	S	3	27	27	3	3B	110	11	101	17	3A				WE 3B	
26	TQ56408850	FRT	W	2	0	30	3	3B	126	5	103	15	3A				WE 3B	
27	TQ56508850	CER	W	3	15	15	3	3B	110	11	89	29	3A				WE 3B	
28	TQ56008840	PGR			0	20	3	3B	124	3	101	17	3A	Y			FL 4	Flooding
29	TQ56108840	LEY	W	2	0	28	3	3B	124	3	102	16	3A				WE 3B	Very plastic
30	TQ56208840	LEY	W	2	0	30	3	3B	129	8	106	12	3A				WE 3B	Ve y plastic
31	TQ56408840	CER	W	2	30	30	3	3B	126	5	103	15	3A				WE 3B	Very plastic
1P	TQ56308850	CER	S	3	28	28	3	3B	124	3	101	17	3A				WE 3B	Ve y pla tic
2P	TQ56408890	CER	NW	2	26	46	3	3A	146	25	107	11	3A				WD 3A	Friable

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	10YR32 41	10YR46	C			Y	0	0		0							
	28 120	C	10YR51 53	10YR58	M			Y	0	0	HR	5		P			Y		Plastic
2	0 28	C	10YR42						0	0	HR	5							
	28 120	C	10YR53 51	10YR58	M			Y	0	0	CH	5		P			Y		Plastic
3	0 30	HCL	10YR42						0	0	HR	5							
	30 45	C	10YR53	10YR58	C			Y	0	0		0		P			Y		Plastic
	45 120	C	10YR51 53	10YR58	M			Y	0	0	CH	10		P			Y	Y	Plastic
4	0 28	C	10YR41	10YR46	C			Y	0	0	HR	2							
	28 120	C	10YR53 51	10YR58	M			Y	0	0		0		P			Y		Plastic
5	0 28	HCL	10YR42						0	0	HR	5							
	28 60	C	10YR53	10YR58	C			Y	0	0		0		P			Y		Plastic
	60 120	C	10YR51 53	10YR58	M			Y	0	0	CH	5		P			Y	Y	Plastic
6	0 30	HCL	10YR32 42						3	0	HR	8							
	30 65	C	10YR51 53	10YR58	M			Y	0	0	HR	5		P			Y		Pl tic
	65 120	C	10YR51 53	10YR58	M			Y	0	0	CH	10		P			Y	Y	Plastic
7	0 28	MCL	10YR42						0	0	HR	5							
	28 45	HCL	10YR53	10YR56	C			Y	0	0	HR	5		M					
	45 60	C	10YR53	10YR56	58 C			Y	0	0		0		P			Y		
	60 120	C	10YR61	10YR58	M			Y	0	0	HR	5		P			Y		With HCL and MS
8	0 22	HCL	10YR32						0	0	HR	2							
	22 100	C	10YR52	75YR56	61 M			Y	0	0		0		P			Y		Plastic
9	0 15	HCL	10YR43						0	0	HR	2							
	15 120	C	10YR52	10YR58	61 C			Y	0	0		0		P			Y		Plastic
10	0 15	MCL	10YR43						1	0	HR	5							
	15 22	HCL	10YR42						0	0	HR	2		M					
	22 50	C	10YR53	05YR46	M			Y	0	0		0		P			Y		Plastic
	50 120	C	10YR53	10YR56	M			Y	0	0		0		P			Y		Plastic
11	0 26	MCL	10YR43						2	0	HR	8							
	26 50	C	10YR52 53	75YR58	M			Y	0	0	HR	2		P			Y		Plastic
	50 80	C	10YR52 53	75YR58	M			Y	0	0	HR	2		P			Y		With HCL and MS
	80 100	SCL	10YR53	10YR58	M			Y	0	0		0		M					With C MSL & HCL
	100 120	MSL	10YR54 53	10YR56	M			Y	0	0		0		M					
12	0 25	HCL	10YR41 42	10YR46	C			Y	0	0		0							
	25 40	HCL	10YR53	10YR56	C			Y	0	0	HR	2		M					
	40 120	C	10YR53	10YR58	M			Y	0	0		0		P			Y		
13	0 35	C	10YR41	10YR46	M			Y	0	0	HR	2							
	35 120	C	10YR53	10YR56	58 M			Y	0	0		0		P			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	
14	0 35	HCL	10YR41	10YR46	C			Y	0	0	HR	5							
	35 60	HCL	25Y 63	10YR56	M			Y	0	0	HR	5		M					
	60 80	C	25Y 62	25Y 62	M			Y	0	0	HR	10		P			Y		Plastic Imp 80
15	0 20	MCL	10YR41	10YR58	C				0	0	HR	2							
	20 45	HCL	10YR53	10YR58	M			Y	0	0	HR	2		M					
	45 120	C	10YR53	10YR58	M			Y	0	0	HR	2		P			Y		Plastic
16	0 28	HCL	25Y 42	10YR56	F				0	0	HR	2							
	28 38	C	25Y 51 52	10YR58	C			Y	0	0	HR	3		P					With HCL and MS
	38 70	HCL	25Y 52 61	10YR56	C			Y	0	0	HR	2		M					
	70 120	HCL	25Y 41	75YR46	M			Y	0	0		0		M					
17	0 15	HCL	10YR43						1	0	HR	4							
	15 30	C	10YR42						0	0	HR	2		M					
	30 60	C	10YR51	75YR58	M			Y	0	0		0		P			Y		Plastic
	60 100	C	10YR53 52	75YR58	M			Y	0	0		0		P			Y		Plastic
18	0 30	MCL	10YR32 42						1	0	HR	4							
	30 38	MCL	10YR42	75YR56	C			Y	0	0		0		M					
	38 100	C	10YR52 53	10YR58	M			Y	0	0		0		P			Y		Plastic
19	0 40	HCL	10YR52	75YR46	C			Y	3	0	HR	15							
	40 65	HCL	10YR53	10YR56	C			Y	0	0	HR	25		M					
	65 120	C	10YR52	10YR58	M			Y	0	0	HR	5		P			Y		Plastic
20	0 25	HCL	10YR42						3	0	HR	15							
	25 55	C	10YR52	10YR58	M			Y	0	0	HR	20		P			Y		Plastic
	55 65	C	10YR53	10YR56	M			Y	0	0	HR	10		P			Y		Pl tic
	65 120	C	10YR53	10YR56	M			Y	0	0	HR	2		P			Y		Plastic
21	0 27	MCL	10YR43						3	0	HR	15							
	27 45	MCL	10YR52	10YR58	C			Y	0	0		0		M					
	45-120	C	10YR52 51	75YR58	M			Y	0	0		0		P			Y		Plastic
22	0 30	HCL	10YR42						0	0		0							
	30 78	HCL	10YR53 51	10YR58	M			Y	0	0	HR	2		M					
	78 82	C	10YR51 53	10YR58	M			Y	0	0	HR	2		P					Imp 82 gra elly
23	0 28	C	10YR42						0	0	HR	2							
	28 100	C	10YR53	10YR56	M			Y	0	0		0		P			Y		Plastic
24	0 28	C	10YR42	00MN00	F				0	0	HR	1							
	28 100	C	10YR53	10YR56	M			Y	0	0		0		P			Y		Plastic
25	0 27	C	10YR42						0	0	HR	2							
	27 100	C	10YR52	75YR56	M			Y	0	0		0		P			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	
26	0 30	HCL	10YR41	10YR46	C			Y	0	0	HR	5							
	30 60	C	10YR53 51	10YR58	M			Y	0	0		0		P		Y			Plastic
	60 120	C	10YR51	10YR58	M			Y	0	0		0		P		Y			Plastic
27	0 15	HCL	10YR42						3	0	HR	10							
	15 45	C	10YR53 51	10YR58	C			Y	0	0	HR	10		P		Y			Plastic
	45 120	C	25Y 51 52	10YR58	M			Y	0	0	HR	10		P		Y		Y	Plastic
28	0 20	HCL	10YR41 42	10YR46	C			Y	0	0		0							
	20 60	C	10YR51 53	10YR58	C			Y	0	0		0		P		Y			Rel plastic
	60 120	C	25Y 62	10YR58	M			Y	0	0		0		P		Y			Plastic
29	0 28	HCL	10YR42	10YR46	C			Y	0	0		0							
	28 120	C	10YR31 35	10YR58	M			Y	0	0	HR	5		P		Y			Plastic
30	0 30	HCL	10YR32 42	10YR56	C			Y	0	0		0							
	30 120	C	10YR51 53	10YR58	M			Y	0	0		0		P		Y			Plastic
31	0 30	HCL	10YR42 32						0	0	HR	5							
	30 120	C	10YR51 53	10YR58	M			Y	0	0		0		P		Y			Plastic

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	ABUN	CONT	PED COL	GLEY	2	STONES 6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
1P	0 28	C	10YR42						0	0	HR	2							
	28 56	C	10YR52 53	10YR58	M			Y	0	0	HR	2	MDCAB	FM	P	Y		Y	Plastic
	56 120	C	10YR53	10YR56	M			Y	0	0		0	WKCAB	FM	P	Y		Y	Plastic
2P	0 26	MCL	10YR32						1	0	HR	5							
	26 46	HCL	10YR53	10YR58	C			Y	0	0	HR	5	MDCSAB	FM	M				
	46 65	C	10YR53	10YR58	M			Y	0	0	HR	2	MDCSAB	FM	P	Y		Y	With CS and MS
	65 100	HCL	10YR53	10YR58	M			Y	0	0	HR	2	MDCSAB	FR	M				With SCL MSL & C
	100 120	MSL	10YR62	10YR58	M			Y	0	0	HR	2	MDCSAB	FR	M				