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**MILTON KEYNES EXPANSION STUDY
Land North of Olney, Buckinghamshire**

**Agricultural Land Classification
ALC Map and Report**

January 1999

**Resource Planning Team
Eastern Region
FRCA Reading**

**RPT Job Number: 0304/009/99
MAFF Reference: EL 03/1621**

AGRICULTURAL LAND CLASSIFICATION REPORT

MILTON KEYNES EXPANSION STUDY LAND NORTH OF OLNEY, BUCKINGHAMSHIRE.

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 19.6 hectares of land east and west of Warrington Road, to the north of Olney in Buckinghamshire. The survey was carried out during January 1999.
2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). It was carried out in connection with MAFF's statutory input to the Milton Keynes Expansion Study. 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 majority of the agricultural land on the site was in permanent grass. The field to the north of the area surveyed was in oil seed rape. The small area shown as 'Other Land' is a derelict barn.

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.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
2	9.3	47.4	47.3
3a	7.4	37.8	37.8
3b	2.9	14.8	14.8
Other land	>0.1	-	0.1
Total surveyed area	19.6	100	99.9
Total site area	19.6	-	100

7. The fieldwork was conducted at an average density of slightly more than 1 boring per hectare of agricultural land. In total, 25 borings and 4 soil pits were described.

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

8. The agricultural land on this site has been classified in the range Grade 2 (very good quality) to Subgrade 3b (moderate quality) with some areas mapped as Subgrade 3a (good quality) land. The principal limitations to land quality include soil droughtiness and soil wetness with flood risk being important in some areas.
9. The very good quality land within the site is limited by soil droughtiness. Soil profiles examined in this area comprise clay loam, silty clay loam or sandy clay loam and, occasionally, clay textures. These soil textures in combination with the slight stoniness prevalent throughout the profiles in the relatively dry local climate lead to a very slight drought limitation sufficient to place this land in Grade 2. This means that although a wide variety of crops may be grown, there may be periods during the growing season when insufficient moisture may be available for crop utilisation. In addition, many of the profiles in this area were slightly affected by soil wetness. This is likely to reduce the versatility of the land by limiting the number of days when access to the land for cultivations and/or grazing is possible without damaging the soil.
10. Good quality land is shown towards the south of the site and in a band alongside the water course in the west of the site. Land in these areas is principally limited by soil wetness caused by either slowly permeable soils, groundwater and/or flood risk. The soil profiles in the south of the site comprise clay loam or silty clay loam topsoils passing to similar and sandy clay loam subsoils which were very slightly to moderately stony overall. In the majority of observations either groundwater was encountered at shallow to moderate depths in the profile or the observation was located close to the flood-prone River Great Ouse. These factors preclude these areas from being placed in a higher grade. In the west of the site the soils comprise heavy silty clay loam topsoils passing to drainage impeding clay subsoils at depths sufficient to restrict to Subgrade 3a on the basis of soil wetness. 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. It will also adversely affect seed germination and root growth and will therefore reduce the level and consistency of yields.
11. The remaining moderate quality land located in the east of the site is also limited by soil wetness in combination with flood risk. The soil profiles in this area comprise medium silty clay loam topsoils overlying poorly drained silty clay subsoils. The nature and depth to the clay in the local climate places these soils in Subgrade 3a. However, the high risk of flooding in this area and the presence of standing water as a result of a recent flood event means that a Subgrade 3b classification is more appropriate. The effects of soil wetness are described in paragraph 10 above. However the limitations caused by soil wetness in this area are more severe than elsewhere on the site.

FACTORS INFLUENCING ALC GRADE

Climate

12. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.
13. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values		
		SP 891 522	SP 884 528	SP 889 527
Grid reference	N/A	SP 891 522	SP 884 528	SP 889 527
Altitude	m, AOD	50	60	65
Accumulated Temperature	day°C (Jan-June)	1427	1416	1410
Average Annual Rainfall	mm	594	601	603
Field Capacity Days	days	121	123	123
Moisture Deficit, Wheat	mm	113	112	111
Moisture Deficit, Potatoes	mm	107	105	104
Overall climatic grade	N/A	Grade 1	Grade 1	Grade 1

14. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.
15. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.
16. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors, such as exposure and frost risk 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

17. The site lies at altitudes in the approximate range of 50-65m AOD. The highest land occurs in the north and west of the site with the lowest towards the south-east, close to the river. Some slopes towards the west of the site were measured at 6° and as such although relatively steep, they do not adversely affect agricultural land quality. Microrelief is also present, in the form of ridge and furrow, towards the east of the site. However, although significant this again was not severe enough to restrict land quality. Towards the east of the site, the land is prone to flooding from the River Great Ouse. At the time of survey some parts of the site contained standing water as the result of a recent flood event. Specific flooding information is not available for this survey area. However, information gained from a local resident suggests that flood events are relatively common. As such the areas adjacent to the river have been downgraded by one grade or subgrade to Subgrades 3a and 3b respectively.

Geology and soils

18. The most detailed available published geological information for the site (BGS, 1983) shows the area of survey to be underlain by a complex pattern of Jurassic deposits. These include Cornbrash and Blisworth limestone to the north west, Toarcian clays and the Upper Estuarine Series to the south east. It is also possible that there have been drift deposits laid down over these within this area close to the River Great Ouse.
19. According to the most recent published information available for this area (SSEW, 1983) the survey area is underlain by three soil associations, namely Moreton, Bishampton 2 and

Thames. Soils within the Moreton association are mapped towards the west and immediate east of the Warrington Road and are described as, 'Well drained calcareous clayey and fine loamy soils over limestone, in places shallow and brashy. Some deeper slowly permeable calcareous clayey soils.' (SSEW, 1983). Thames association soils are mapped in close proximity to the River Great Ouse which forms the eastern boundary of the site. They are described as 'Stoneless, mainly calcareous clayey soils affected by groundwater. Flat land. Risk of flooding' (SSEW, 1983). Between the Thames and the Moreton associations, the remaining land to the east of the Warrington Road is mapped as the Bishampton 2 association. These are described as 'Deep fine loamy and fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging associated with similar slowly permeable seasonally waterlogged soils' (SSEW, 1983). Soils conforming to all the descriptions above were encountered during the survey.

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.

Grade 2

22. Very good quality land is located towards the west and north of the site. Soil droughtiness is the principal limitation, although soil wetness and topsoil workability are equally limiting in many cases. Soil pits, 1P and 4P (see Appendix II) are representative of the range of soils found in this area.
23. Soils here comprise medium or heavy clay loam, occasionally silty clay loam topsoils passing to similar upper subsoils, most of which were calcareous. These overlie calcareous lower subsoils of either heavy clay loam, sandy clay loam or clay, occasionally medium sandy loam texture. Stone contents in the topsoil and upper subsoil are generally slight with up to 10% flints by volume recorded on occasion. In the lower subsoil up to 20% stones by volume were recorded. The stones in the lower subsoil were mostly flints although hard chalk was observed on occasion. The stones present restrict the water holding capability of the profile by reducing the overall volume of the moisture retaining medium. This, in combination with water retaining soil textures and the relatively dry climate in this area cause this land to be slightly limited by droughtiness; ie, sufficient water may not be available to plants over the entire growing season and hence maximum yields may not be realised. However, a wide range of crops may be successfully grown in this area.
24. Many of the soils in this area exhibited gleying at shallow (<40cm) depths which lead them to be placed in Wetness Class II and, subsequently, Grade 2 when the medium workability of the topsoil is accounted for in the relatively dry local climate. The profiles with heavier topsoils were not gleyed within 40cm but because they are more difficult to work these profiles are appropriately placed in Grade 2 on the basis of topsoil workability. These factors mean that the versatility of this area in terms of access to the land for cultivations or grazing during wetter periods is adversely affected.

Subgrade 3a

25. Good quality land is shown in two parts of the area surveyed. The largest is located towards the centre and south-east of the site. The second, smaller, unit is located along the margins of a small stream to the west of the site. The principal limitation in both cases is soil wetness, as a result of either shallow groundwater, shallow slowly permeable horizons or the proximity of flood prone water courses. The soils in these areas are variable overall; some are typified by soil pit 3 (see Appendix II).
26. In the unit mapped towards the centre and south-east of the site two soil types were observed. The first, to the north of this unit, comprises a non-calcareous, occasionally gleyed, silt loam, medium silty clay loam or medium clay loam topsoil which, in some cases, contained a significant quantity of organic matter. These pass to commonly calcareous, stoneless or very slightly stony (0-5% flints by volume), moderately structured, gleyed heavy clay loam or heavy silty clay loam, occasionally clay upper subsoils. These pass to gleyed, calcareous, moderately stony (27% flints by volume as measured in 3P) sandy clay loam, heavy clay loam or heavy silty clay loam lower subsoils which were, at the time of survey, saturated from 60cm on average and often impenetrable to the soil auger from 70cm. In the dry local climate Wetness Class II and Grade 2 is appropriate. However, given the observed depth of the water table and the amount of standing water visible at the time of survey, a Subgrade 3a classification is considered more appropriate.
27. The second soil type in this larger Subgrade 3a unit comprises medium clay loam topsoils overlying heavy clay loam and sandy clay loam subsoils which were stoneless to slightly stony (up to 10% flints by volume) and only occasionally observed to be slightly affected by soil wetness in the form of gleying or slight gleying. In the local climate these observations are appropriately placed in Wetness Class I and any droughtiness limitation is slight. However, because this land is adjacent to the River Great Ouse a Subgrade 3a classification is considered the most appropriate given the flood risk present and the permeable nature of the soils in this particular area. If detailed flood event data was available for this area of survey, it may show that this land adjacent to the river is not of best and most versatile quality.
28. The third Subgrade 3a soil type is located in the smaller unit of good quality land mapped to the west of the site. This is located on a strip of lower lying land adjacent to a small incised water course which is in part a canalised stream and also a drainage channel from rising arable land outside the site to the north. The soils in this area comprise calcareous, very slightly stony (2% flints by volume) heavy silty clay loam topsoils passing to shallow, gleyed, stoneless, calcareous moderately structured clay upper subsoils. The deep lower subsoils comprise calcareous, poorly structured, gleyed and slowly permeable clays which were plastic at the time of survey. In the local climate these soils are appropriately placed in Wetness Class III. Although the topsoils are heavy textured and therefore relatively difficult to work, their calcareous nature means that Subgrade 3a is the most appropriate classification with soil wetness as the principal limitation.
29. Excessive soil wetness 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. These factors may be exacerbated by flood events and/or shallow groundwater.

Subgrade 3b

30. A portion of the site to the east has been classified as being of moderate quality. Land quality in this area is principally restricted by soil wetness and flood risk. Soil pit 2 (see Appendix II) is typical of the observations in this area.
31. Soils in this area comprise non-calcareous, stoneless medium silty clay loam or medium clay loam topsoils. These directly overlie non-calcareous, stoneless, poorly structured, gleyed and slowly permeable clay or silty clay subsoils. In the local climate this would normally result in Wetness Class III and subsequently Subgrade 3a being applied. However, given the location of this land close to the flood-prone River Great Ouse, the resultant seasonally high water levels and the standing water apparent on the site at the time of survey as a result of a recent flood event, Wetness Class IV and Subgrade 3b is considered to be a more appropriate classification. From evidence supplied by the Environment Agency it is not possible to be absolutely sure of the level of flood risk in this area but given the observations at the time of survey, Subgrade 3b is again considered the most appropriate classification.
32. The effects of soil wetness are described above in paragraph 28. In this area these effects are significantly enhanced by the flood risk which further restricts the versatility of the land and may cause crop establishment and/or growth to be severely affected.

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SOURCES OF REFERENCE

British Geological Survey (1983) *Sheet 52°N - 02°W, East Midlands. Solid Edition, 1:250,000 Scale.*
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. 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	WIT:	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. **GLEV/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	FSST:	soft, fine grained sandstone
ZR:	soft, argillaceous, or silty rocks	CII:	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	ASPECT USE	--WETNESS--				-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC COMMENTS
			GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT				
1	SP88405280	PGR NE	3			1	2	139	27	107	2	2			WD 2	GWATER 75
2	SP88605270	PGR NE	6	22		2	2	129	17	107	2	2			WD 2	4P LOCATION
3	SP88905270	OSR SE	4			2	2	106	-6	107	2	3A			DR 3A	IMP 80 LSTONE
4	SP89005270	OSR S	3	75	75	2	2	138	26	113	8	2			WD 2	
5	SP88765258	PGR NE	2			1	2	140	28	116	11	2			WD 2	
6	SP88905260	OSR SE	5	28	95	2	2	130	18	109	4	2			WD 2	1P LOCATION
7	SP89005260	OSR S	1			1	1	85	-27	88	-17	3B			DR 3B	IMP 55 LSTONE
8	SP88845252	PGR		28		2	2	119	7	113	8	2			WD 2	GWATER 90
9	SP88905244	PGR NE	4	30		2	2	144	32	107	2	2			WD 2	
10	SP89005230	PGR SE	1			1	1	119	7	127	22	2			DR 2	IMP 75 FLINTS
11	SP89105220	PGR		55		1	1	125	13	121	16	2			DR 2	IMP90 GWATER90
12	SP89205220	PGR		0		3	3A	111	-1	122	17	3A			WD 3A	3PLOC GWATER70
13	SP89305220	PGR		0		3	3A	106	-6	119	14	3A			WD 3A	IMP70 GWATER70
14	SP89405220	PGR		20	20	3	3A	95	-17	98	-7	3A	Y		FL 3B	2P LOCATION
15	SP89205210	PGR		0	22	3	3A	136	24	103	-2	2			WE 3A	
16	SP89305210	PGR		0		3	3A	148	36	116	11	1			WE 3A	GWATER 60
17	SP89405210	PGR		19	19	3	3A	94	-18	97	-8	3A	Y		FL 3B	SEE 2P
18	SP89305200	PGR				1	1	153	41	115	10	1	Y		FL 3A	GWATER 80
19	SP89405200	PGR		60		1	1	150	38	114	9	2	Y		FL 3A	
20	SP89405190	PGR				1	1	148	36	113	8	2	Y		FL 3A	
21	SP88515275	PGR N	1	80	80	1	2	135	23	115	10	2			WD 2	
22	SP88695264	PGR NE	4	25		2	2	143	31	109	4	2			WD 2	
23	SP88965252	OSR S	1	75	75	2	2	134	22	108	3	2			WD 2	
24	SP88625264	PGR NE	6	60		1	2	139	27	107	2	2			WD 2	
25	SP88555274	PGR		20	35	3	3A	130	18	107	2	2			WE 3A	C PLASTIC 60+
1P	SP88905260	OSR SE	5	25	62	2	2	131	19	110	5	2			WD 2	PIT 80 AUG 120
2P	SP89405220	PGR		19	19	3	3A	78	-34	81	-24	3B	Y		FL 3B	PIT 55 @ASP 14
3P	SP89205220	PGR		22		3	3A	139	27	112	7	2			WE 3A	PIT 75 AUG 120
4P	SP88605270	PGR NE	5	18		2	2	134	22	111	6	2			WD 2	PIT 80 AUG 120

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED COL.	-----STONES-----			STRUCT/ CONSIST	SUBS STR POR IMP SPL CALC				
				COL	ABUN	CONT		GLE	>2	>6				LITH	TOT	
1	0-22	HCL	10YR42					0	0	HR	5			Y		
	22-60	C	10YR44 54					0	0	HR	10	M		Y		
	60-75	HCL	75YR44 54					0	0	HR	15	M		Y		
	75-120	SCL	75YR46 56					0	0	HR	10	M		Y	WET	
2	0-22	HCL	10YR42					0	0	HR	5			Y	4P LOCATION	
	22-55	HCL	10YR53 10YR56	C	D			Y	0	0	HR	5	M		Y	
	55-120	C	10YR52 51 10YR58	C	D			Y	0	0	HR	5	M		Y	
3	0-25	MCL	10YR42					1	0	HR	8			Y		
	25-65	HCL	10YR44 54					0	0	HR	10	M		Y		
	65-80	HCL	25Y 74 10YR68	F	D			0	0	HR	5	M		Y	IMP80 WEATH L/ST	
4	0-35	MCL	10YR42					3	0	HR	5			Y		
	35-75	HCL	10YR54				FEW MN	0	0	HR	5	M		Y		
	75-120	C	25Y 62 10YR58	C	D			Y	0	0	0	P		Y	Y	
5	0-20	HCL	10YR42					0	0		0					
	20-33	C	10YR54					0	0		0	M				
	33-65	C	10YR54 10YR56	F	F		FEW MN	0	0	HR	2	M		Y		
	65-120	C	10YR53 54 10YR56	F	F		FEW MN	0	0		0	M				
6	0-28	HCL	10YR42					1	0	HR	5			Y	1P LOCATION	
	28-50	HCL	10YR52 53 10YR58	C	D		COM MN	Y	0	0	HR	10	M		Y	SL. SANDY
	50-95	C	10YR53 61 10YR58	M	D		FEW MN	Y	0	0	HR	10	M		Y	SPL 60+ (1P)
	95-120	C	05G 61 10YR58	M	D		FEW MN	Y	0	0		0	P		Y	Y
7	0-30	MCL	10YR32					3	0	HR	5			Y		
	30-55	HCL	10YR53					0	0	HR	10	M		Y	IMP 55 LSTONE	
8	0-26	MCL	10YR32					0	0		0			Y	SEE 1P	
	26-55	C	10YR62 10YR56	C	F			Y	0	0		0	M		Y	
	55-90	SCL	10YR62 10YR58	M	D			Y	0	0	HR	15	M		Y	IMP90 GRAVELY/WET
9	0-15	MZCL	10YR31					0	0	HR	3			Y	POSS ORG TS	
	15-30	MCL	10YR44					0	0	HR	5	M		Y		
	30-60	MCL	10YR52 10YR58	M	D			Y	0	0	HR	10	M		Y	SL SANDY
	60-100	SCL	10YR51 10YR58	M	D			Y	0	0	HR	15	M		Y	
	100-120	MSL	25Y 51 10YR58	M	D			Y	0	0	HR	5	M		Y	
10	0-20	ZL	10YR42					0	0		0			Y	POSS ORG TS	
	20-58	HZCL	25Y 44					0	0		0	M		Y		
	58-75	HZCL	25Y 54 10YR68	C	D			S	0	0	HR	20	M		Y	IMP 75 GRAVELLY
11	0-18	MZCL	10YR42					0	0		0			Y		
	18-55	HZCL	25Y 54 44					0	0		0	M		Y		
	55-78	HZCL	25Y 53 10YR58	C	D		COM MN	Y	0	0	HR	5	M		Y	
	78-90	MZCL	25Y 56					0	0	HR	20	M		Y	IMP90 GRAVELY/WET	

SAMPLE	DEPTH	TEXTURE	COLOUR	-----MOTTLES-----			PED COL.	-----STONES-----			STRUCT/ CONSIST	SUBS			CALC
				COL	ABUN	CONT		GLEY	>2	>6 LITH		TOT	STR	POR	
12	0-18	ZL	10YR32	10YR46	C	D		Y	0	0	0				3P LOCATION
	18-60	HCL	25Y 52	10YR58	M	D		Y	0	0	0	M		Y	
	60-70	SCL	25Y 53	10YR56	C	D		Y	0	0	HR 25	M		Y	IMP70 GRAVLY/WET
13	0-27	MZCL	10YR42	10YR46	C	D		Y	0	0	0				SEE 3P
	27-60	HZCL	10YR53	10YR56	C	F		Y	0	0	HR 5	M			
	60-70	MZCL	25Y 53						0	0	HR 20	M		Y	IMP70 GRAVLY/WET
14	0-20	MZCL	10YR32						0	0	0				2P LOCATION
	20-80	ZC	25Y 62	10YR58	M	D		Y	0	0	0	P		Y	Y PLASTIC
15	0-16	MZCL	10YR32	10YR46	C	D		Y	0	0	0				JUNCUS SPP.
	16-22	HZCL	10YR41	10YR46	M	D		Y	0	0	0	M			
	22-58	C	25Y 52	10YR56	M	D		Y	0	0	0	P		Y	Y
	58-120	SCL	25Y 53	10YR56	C	D		Y	0	0	HR 15	M		Y	MOIST
16	0-22	MZCL	10YR42	10YR46	C	F		Y	0	0	0				SEE 3P
	22-60	HCL	10YR53	10YR56	C	F		Y	0	0	0	M			
	60-95	HCL	25Y 53	10YR58	M	D	MANY MN	Y	0	0	HR 20	M		Y	WET
	95-120	SCL	25Y 53	10YR58	C	D		Y	0	0	HR 10	M		Y	SATURATED
17	0-19	MZCL	10YR32						0	0	0				SEE 2P
	19-80	ZC	25Y 62	10YR58	M	D		Y	0	0	0	P		Y	Y PLASTIC
18	0-25	MCL	10YR41						0	0	HR 3				
	25-60	HCL	10YR44 54						0	0	0	M			
	60-80	SCL	10YR54	10YR56	C	F		S	0	0	0	M			SL GLEYED
	80-120	SCL	75YR46 56						0	0	HR 3	M			
19	0-27	MCL	10YR42						0	0	0				
	27-60	HCL	10YR53						0	0	HR 5	M		Y	
	60-120	HCL	10YR53	10YR56	C	D		Y	0	0	HR 5	M		Y	SL. SANDY
20	0-27	MCL	10YR42						0	0	HR 2			Y	
	27-100	HCL	10YR43						0	0	HR 5	M			
	100-120	HCL	10YR43	10YR46	C	D		S	0	0	HR 10	M		Y	SL. SANDY
21	0-26	HCL	10YR32						0	0	0			Y	
	26-60	C	10YR54	10YR56	F	F			0	0	0	M		Y	
	60-80	C	10YR54						0	0	HR 15	M		Y	
	80-120	C	10YR534	10YR56	C	D	FEW MN	Y	0	0	0	P		Y	Y
22	0-25	MCL	10YR42						0	0	HR 3			Y	
	25-50	HCL	10YR53	10YR58	C	D		Y	0	0	HR 10	M		Y	
	50-80	HCL	25Y 62	10YR58	C	D		Y	0	0	HR 10	M		Y	
	80-120	HCL	25Y 61 71	10YR68	C	D		Y	0	0	HR 10	M		Y	
23	0-28	MCL	10YR42						0	0	0			Y	
	28-75	SCL	10YR54						0	0	HR 10	M		Y	
	75-120	C	25Y 62	10YR58	C	D		Y	0	0	0	P		Y	Y

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED	----STONES----			STRUCT/	SUBS	SPL	CALC		
				COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT				CONSIST
24	0-22	HCL	10YR42					0	0	HR	5				Y	
	22-35	HCL	10YR44 54	10YR56	F	F		0	0	HR	10		M		Y	
	35-60	HCL	10YR54	10YR56	F	F		0	0	HR	10		M		Y	
	60-120	HCL	10YR52 53	10YR56	C	F		Y	0	0	HR	15		M		Y
25	0-20	HZCL	10YR42 41					0	0	HR	2				Y	
	20-35	C	10YR53	10YR56	C	D		Y	0	0	0		M		Y	
	35-60	C	25Y 52	10YR58	M	D		Y	0	0	0		P		Y Y	
	60-85	C	25Y 51	75YR58	M	D		Y	0	0	0		P		Y Y	
	85-120	C	05Y 51	75YR58	M	D		Y	0	0	0		P		Y S	
1P	0-25	HCL	10YR42					1	0	HR	3				Y	
	25-50	HCL	10YR53 52	10YR58	C	D		Y	0	0	HR	5	MDCSAB	FR	M	Y
	50-62	C	10YR62 52	10YR68	C	D		Y	0	0	HR	5	MDCSAB	FR	M	Y
	62-85	C	10YR62	10YR58	M	D		Y	0	0	HR	3	MDCAB	FM	P	Y Y
	85-100	C	05G 61	10YR58	M	D	COM MN	Y	0	0	0		FM	P		Y Y
	100-120	HCL	25Y 71	10YR68	M	D		Y	0	0	HR	5		FM	P	Y Y
2P	0-19	MCL	10YR32					0	0	0					Y	
	19-55	C	25Y 62	10YR56	M	D		Y	0	0	0	MDCAB	FM	P	Y Y	
3P	0-22	MZCL	10YR31	75YR46	F	D		0	0	HR	2				Y	
	22-60	HCL	25Y 61	10YR58	C	D		Y	0	0	HR	2	MDCSAB	FR	M	Y
	60-120	SCL	25Y 53	10YR56	C	D		Y	0	0	HR	27		FR	M	Y
4P	0-18	HCL	10YR42					0	0	HR	2				Y	
	18-48	C	10YR53	10YR56	C	F		Y	0	0	HR	5	MDCSAB	FR	M	Y
	48-120	C	10YR51 61	10YR58 68	C	D		Y	0	0	HR	5	MDCSAB	FR	M	Y

PIT @ ASP 6
 PIT @ ASP14
 AUG 80 FLOODED
 ORG TS? @ASP12
 G*WATER MAX 44
 PIT 75 AUG 120
 PIT @ ASP 2
 PIT 80 AUG 120