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**Proposed golf course,
Woolmer Farm, Bramshott, Hampshire.
Agricultural Land Classification,
ALC Map and Report.
June 1995**

AGRICULTURAL LAND CLASSIFICATION REPORT.

PROPOSED GOLF COURSE AT WOOLMER FARM, BRAMSHOTT, HAMPSHIRE.

1. Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for an area of land at Woolmer Farm at Bramshott in Hampshire. The work forms part of MAFF's statutory input to an application for the construction of a golf course.
- 1.2 The site comprises approximately 89 hectares of land around Woolmer Farm to the north of the village of Bramshott. An Agricultural Land Classification (ALC) survey was carried out in June 1995. The survey was undertaken at a semi-detailed level of approximately one boring per 2.5 hectares of agricultural land surveyed. A total of 25 borings and two soil inspection pits were assessed according to MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on its use for agriculture.
- 1.3 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.
- 1.4 At the time of the survey the agricultural land on the site comprised permanent grassland. The area marked as urban includes a tarmac road, non-agricultural land comprises scrubland. Areas of woodland and farm buildings have also been marked on the map.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1: Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site
3b	61.7	69.7
Non-agricultural	0.8	0.9
Woodland	24.6	27.8
Urban	1.2	1.4
Farm buildings	<u>0.2</u>	<u>0.2</u>
Total area of Site	88.5	100%

- 1.6 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.7 All of the agricultural land surveyed on the site has been classified as Subgrade 3b, moderate quality land, with soil droughtiness as the main limitation. Soils on the site typically comprise coarse sandy textured topsoils which become more sandy with depth, containing variable amounts of hard sandstone. Consequently, these soils show a significant restriction on profile available water which can affect the level and consistency of crop yields. Therefore a classification of Subgrade 3b due to droughtiness is appropriate. Occasionally, profiles were more clayey and showed evidence of being limited to Subgrade 3b by poor drainage leading to soil wetness restrictions.

2. Climate

2.1 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.

2.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality.

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office, 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site. However, climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the comparatively high average annual rainfall, and correspondingly high field capacity days, increase the likelihood of soil wetness. Similarly the low crop adjusted soil moisture deficits may reduce the likelihood of soil droughtiness.

2.4 No local climatic limitations such as exposure or frost risk are believed to adversely affect this site.

Table 2: Climatic Interpolations

Grid Reference	SU 838 343
Altitude, (m, AOD)	120
Accumulated Temperature (day degrees C., Jan.-June)	1400
Average Annual Rainfall (mm)	880
Field Capacity Days	193
Moisture deficit, wheat (mm)	96
Moisture deficit, potatoes (mm)	85
Overall Climatic Grade	1

3. Relief

3.1 The site slopes from approximately 125m AOD in the north east to 100m in the south and south west. The landscape is gently undulating with a small dry valley feature running north east to south west through the wooded area in the centre.

4. **Geology and Soils**

- 4.1 The published geological information (BGS, 1981), shows all of the site to be underlain by the Lower Greensands which are divided into the Bargate Beds in the south and the Hythe beds in the north. The Bargate beds comprise glauconitic or calcareous sands with hard calcareous sandstone (BGS, 1981) and the Hythe beds are yellow weathered sand and sandstone which may have a springline at the base (BGS, 1981).
- 4.2 The published soils information (SSEW, 1983), shows the entire site to be underlain by soils of the Frilford association. The legend accompanying the map describes these soils as 'deep well drained sandy and coarse loamy soils. Some ferruginous sandy and some coarse loamy soils affected by groundwater' (SSEW, 1983).
- 4.3 Detailed field examination revealed the soils on this site to be similar to those described in paragraph 4.2, comprising loamy medium sands over medium sands with sandstone bands.

5. **Agricultural Land Classification**

- 5.1 The location of the soil observation points are shown on the attached sample point map.

Subgrade 3b

- 5.2 All of the agricultural land on this site has been mapped as Subgrade 3b, moderate quality land, with soil droughtiness as the main limitation. Occasional profiles were found to have a wetness limitation. Soil profiles typically comprise very slightly to slightly stony (2-15% hard sandstone fragments, of which 4-9% are >2cm in diameter) loamy medium sand topsoils over moderately stony (generally 10-25% hard sandstone) upper subsoils of similar or coarser texture (i.e. medium sands). The lower subsoils vary from deep, stone free, medium sands to shallower horizons where hard bands of sandstone proved impenetrable to the soil auger. Both soil inspection pits 1 and 2 are representative of these soils. These show that the sandstone bands are not continuous, and therefore do not impede plant rooting. However, a combination of soil textures, structures and stone contents means that there is a restriction on the amount of profile available water for plant growth. Given the local climatic regime, this will affect the level and consistency of crop yields such that a classification of Subgrade 3b is appropriate due to this significant droughtiness limitation.
- 5.3 A small area of land, adjacent to the gardens at Ludshott Manor, were assessed as Subgrade 3b on the basis of soil wetness. Here the soil profiles comprise slightly stony (2-10 % hard rock) medium sandy loam topsoils over stoneless sandy clay loam upper subsoils. A slowly permeable clay subsoil was encountered at a relatively shallow depth, acting to restrict soil drainage. Such drainage characteristics equate these soils to Wetness Class IV. Poorly drained wet soils can inhibit plant growth and rooting, and may be more susceptible to structural

damage through trafficking by agricultural machinery or poaching by grazing livestock.

- 5.4 Occasional individual borings of slightly better quality land were observed on the site. Additional borings were made to check the extent of this land, but these confirmed however, that this land is not sufficiently extensive to warrant mapping as a separate unit.

ADAS Ref: 1502/124/95
MAFF Ref: EL15/1198

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1981), Sheet 301, Haslemere, Solid & Drift Edition. 1:50,000

MAFF (1988), Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

Soil Survey of England and Wales (1983), Sheet No.6, Soils of South-East England, 1:250,000, and Accompanying Legend.

Soil Survey of England and Wales (1984), Bulletin No.15, Soils and their use in South-East England.

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 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 (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 which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: private parkland, public open spaces, sports fields, allotments and soft-surfaced areas on airports. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg. polythene tunnels erected for lambing) may be ignored.

Open Water

Includes lakes, ponds and rivers as map scale permits.

Land Not Surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging ¹
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years. ²
II	The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

¹The number of days specified is not necessarily a continuous period.

²'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

Soil Abbreviations - Explanatory Note

Soil Pit Descriptions

Database Printout - Boring Level Information

Database Printout - Horizon Level Information

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	DCW : Deciduous Wood
HTH : Heathland	BOG : Bog or Marsh	FLW : Fallow
PLO : Ploughed	SAS : Set aside	OTH : Other
HRT : Horticultural Crops		

3. **GRDNT** : Gradient as estimated or measured by a hand-held optical clinometer.
4. **GLEYSPL** : 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	EX : Exposure
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
ST : Topsoil Stoniness		

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	SLST :	soft oolitic or dolimitic limestone
CH :	chalk	FSST :	soft, fine grained sandstone
ZR :	soft, argillaceous, or silty rocks	GH :	gravel with non-porous (hard) stones
MSST :	soft, medium grained sandstone	GS :	gravel with porous (soft) stones
SI :	soft weathered igneous/metamorphic rock		

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 **VC** : very 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 : WOOLMER FARM GOLF COURSE Pit Number : 1P

Grid Reference: SUB3403440 Average Annual Rainfall : 880 mm
 Accumulated Temperature : 1400 degree days
 Field Capacity Level : 193 days
 Land Use : Permanent Grass
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	LMS	10YR43 00	9	15	HR					
28- 50	LMS	10YR56 00	0	25	HR		WKMSAB	VF	M	
50-120	MS	10YR66 00	0	30	HR		WKMSAB	VF	M	

Wetness Grade : 1 Wetness Class : I
 Gleying : cm
 SPL : No SPL

Drought Grade : 3B APW : 58 mm MBW : -38 mm
 APP : 46 mm MBP : -39 mm

FINAL ALC GRADE : 3B
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : WOOLMER FARM GOLF COURSE Pit Number : 2P

Grid Reference: SUB3803400 Average Annual Rainfall : 880 mm
 Accumulated Temperature : 1400 degree days
 Field Capacity Level : 193 days
 Land Use : Permanent Grass
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 29	LMS	10YR43 00	6	10	HR					
29- 76	MS	10YR56 00	0	20	HR		WKCSAB	VF	M	
76-120	MS	10YR66 74	0	6	HR		WKCPL	VF	M	

Wetness Grade : 1 Wetness Class : I
 Gleying : cm
 SPL : No SPL

Drought Grade : 3B APW : 62 mm MBW : -34 mm
 APP : 46 mm MBP : -39 mm

FINAL ALC GRADE : 3B
 MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--			-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYS	SPL	CLASS	GRADE	AP	MB	AP	MB					
1P	SU83403440	PGR				1	1	58	-38	46	-39	3B		DR	3B	
2	SU83403480	PGR	SE	03	S30 060	3	3A	109	13	82	-3	2		WE	3A	SANDY C
2P	SU83803400	PGR				1	1	62	-34	46	-39	3B		DR	3B	
4	SU83603480	PGR				1	1	111	15	71	-14	3A		DR	3A	
5	SU83703480	PGR				1	1	50	-46	49	-36	3B		DR	3B	IMP 80 SST
6	SU83803480	PGR				1	1	41	-55	41	-44	4		DR	3B	
9	SU83403470	PGR	SE	02	S40	1	1	68	-28	52	-33	3B		DR	3B	
10	SU83503470	PGR			S30	1	1	117	21	106	21	2		DR	2	IMP 90 SST
11	SU83603470	PGR				1	1	55	-41	55	-30	3B		DR	3B	IMP 50 SST
15	SU83303460	PGR			S40	1	1	45	-51	47	-38	4		DR	3B	IMP 60 SST
16	SU83403460	PGR	SE	01	S35	1	1	58	-38	52	-33	3B		DR	3B	IMP 95 SST
18	SU83603460	PGR				1	1	44	-52	44	-41	4		DR	3B	IMP 40 SST
19	SU83703460	PGR				1	1	43	-53	43	-42	4		DR	3B	IMP 45 SST
20	SU83803460	PGR				1	1	80	-16	54	-31	3B		DR	3B	
32	SU83203440	PGR			S45	1	1	56	-40	52	-33	3B		DR	3B	IMP 90 SST
34	SU83403440	PGR				1	1	38	-58	38	-47	4		DR	3B	IMP 50 SST
36	SU83603440	PGR				1	1	46	-50	46	-39	3B		DR	3B	IMP 30 SST
51	SU83203420	LEY			S40	1	1	51	-45	50	-35	3B		DR	3B	IMP 80 SST
57	SU83803420	PGR				1	1	67	-29	50	-35	3B		DR	3B	
59	SU84003420	PGR			S26 030	4	3B	121	25	98	13	2		WE	3B	
69	SU84003410	PGR			042	4	3B	106	10	104	19	2		WE	3B	
71	SU83603400	PGR				1	1	50	-46	50	-35	3B		DR	3B	IMP 80 SST
73	SU83803400	PGR				1	1	65	-31	49	-36	3B		DR	3B	
75	SU84003400	PGR			S75	1	1	122	26	87	2	2		DR	2	
76	SU84103400	PGR				1	1	66	-30	49	-36	3B		DR	3B	
83	SU83803380	PGR				1	1	64	-32	47	-38	3B		DR	3B	
85	SU84003380	PGR				1	1	63	-33	48	-37	3B		DR	3B	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED		----STONES----			STRUCT/ CONSIST	SUBS			CALC	
				COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH		TOT	STR	POR		IMP
1P	0-28	1ms	10YR43 00						9	3	HR	15					
	28-50	1ms	10YR56 00						0	0	HR	25	WKMSAB	VF	M		
	50-120	ms	10YR66 00						0	0	HR	30	WKMSAB	VF	M		
2	0-30	ms1	10YR33 00						0	0	HR	5					
	30-60	1ms	10YR54 00	10YR56	00	M		S	0	0	HR	5			M		
	60-120	c	10YR53 00	10YR56	68	M		Y	0	0		0			P		Y
2P	0-29	1ms	10YR43 00						6	0	HR	10					
	29-76	ms	10YR56 00						0	0	HR	20	WKCSAB	VF	M		
	76-120	ms	10YR66 74						0	0	HR	6	WKCP	VF	M		
4	0-30	ms1	10YR43 68						0	0	HR	5					
	30-45	1ms	10YR56 00						0	0	HR	15			M		
	45-80	ms	10YR66 00						0	0	HR	10			M		
	80-120	sc1	75YR56 00						0	0	HR	2			M		
5	0-35	1ms	10YR42 00						6	3	HR	10					IMPEN 80
	35-80	ms	10YR66 00						0	0	HR	20			M		HARD SANDSTONE
6	0-32	1ms	10YR42 00						0	0	HR	5					IMPEN 50
	32-50	ms	10YR56 00						0	0	HR	15			M		HARD SANDSTONE
9	0-30	1ms	10YR33 00						0	0	HR	5					
	30-40	ms	10YR44 00						0	0	HR	5			M		
	40-70	ms	10YR44 00	10YR56	00	C		S	0	0	HR	2			M		
	70-120	ms	10YR54 00	10YR56	00	M		S	0	0		0			M		
10	0-30	ms1	10YR33 00						0	0	HR	5					
	30-65	ms1	10YR54 00	10YR68	00	M		S	0	0	HR	5			M		IMPEN 90
	65-90	sc1	10YR54 00	10YR54	00	M		S	0	0	HR	5			M		HARD SANDSTONE
11	0-30	ms1	10YR32 00						8	3	HR	12					
	30-45	ms	10YR56 00						0	0	HR	12			M		IMPEN 50
	45-50	ms	10YR56 00						0	0	HR	20			M		HARD SANDSTONE
15	0-30	1ms	10YR33 00						0	0	HR	5					
	30-40	1ms	10YR33 00						0	0	HR	10			M		
	40-50	ms	10YR44 00	10YR56	00	C		S	0	0	HR	5			M		IMPEN 60
	50-60	ms	10YR54 00	10YR68	00	M		S	0	0	HR	10			M		HARD SANDSTONE
16	0-25	1ms	10YR33 00						0	0	HR	3					
	25-35	1ms	10YR44 00						0	0	HR	3			M		
	35-55	ms	10YR44 00	10YR56	00	C		S	0	0	HR	3			M		
	55-80	ms	10YR54 00	10YR56	00	M		S	0	0		0			M		IMPEN 95
	80-95	ms	10YR54 00	10YR56	00	M		S	0	0	HR	10			M		HARD SANDSTONE
18	0-30	1ms	10YR43 68						0	0	HR	2					IMPEN 40
	30-40	ms1	10YR42 68						0	0	HR	10			M		HARD SANDSTONE

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES-----			STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL	CALC
19	0-25	lms	10YR42 00						0	0	HR	2						
	25-38	lms	10YR56 00						0	0	HR	5	M					IMPEN 45
	38-45	msl	10YR56 00						0	0	HR	20	M					HARD SANDSTONE
20	0-32	lms	10YR42 00						0	0	HR	5						
	32-50	lms	10YR56 00						0	0	HR	10	M					
	50-70	ms	10YR66 00						0	0	HR	10	M					
	70-85	sc1	75YR56 00						0	0	HR	2	M					
	85-120	ms	10YR66 76						0	0		0	M					
32	0-25	lms	10YR33 00						0	0	HR	5						
	25-45	lms	10YR44 00						0	0	HR	10	M					
	45-65	ms	10YR44 54	10YR56 00	C			S	0	0	HR	2	M					IMPEN 90
	65-90	ms	10YR54 00	10YR56 00	M			S	0	0	HR	5	M					HARD SANDSTONE
34	0-25	lms	10YR33 00						0	0	HR	5						IMPEN 50
	25-50	ms	10YR44 46						0	0	HR	10	M					HARD SANDSTONE
36	0-30	msl	10YR42 00						0	0	HR	10						IMPEN 30
51	0-25	lms	10YR33 00						0	0	HR	5						
	25-40	lms	10YR44 00						0	0	HR	5	M					
	40-65	ms	10YR44 54	10YR56 00	C			S	0	0	HR	10	M					IMPEN 80
	65-80	ms	10YR54 00	10YR68 00	M			S	0	0	HR	10	M					HARD SANDSTONE
57	0-29	lms	10YR53 00						0	0	HR	6						
	29-50	ms	10YR54 56						0	0	HR	10	M					
	50-120	ms	10YR56 00						0	0		0	M					
59	0-26	msl	10YR43 00						0	0	HR	10						
	26-30	sc1	10YR54 00	10YR58 00	C			S	0	0		0	M					
	30-120	c	10YR62 00	10YR68 71	C			Y	0	0		0	P					Y
69	0-30	msl	10YR42 00	10YR56 61	C			Y	0	0	HR	2						
	30-42	sc1	10YR53 00	10YR58 61	C			Y	0	0		0	M					
	42-90	c	10YR62 00	75YR68 71	M			Y	0	0		0	P					Y
71	0-29	lms	10YR43 00						0	0	HR	6						
	29-50	ms	10YR56 00						0	0		0	M					IMPEN 80
	50-80	ms	10YR56 00						0	0	HR	20	M					HARD SANDSTONE
73	0-30	lms	10YR43 00						6	0	HR	10						
	30-50	ms	10YR54 00						0	0	HR	15	M					
	50-120	ms	10YR56 74						0	0	HR	5	M					
75	0-30	msl	10YR43 00						5	0	HR	8						
	30-55	lms	10YR54 00						0	0	HR	5	M					
	55-75	sc1	10YR54 00						0	0		0	M					
	75-90	hc1	10YR56 00	10YR58 00	C			S	0	0		0	M					
	90-120	c	10YR54 56	10YR58 00	C			S	0	0		0	M					

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED		----STONES----			STRUCT/ CONSIST	SUBS				
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR	IMP	SPL
76	0-26	1ms	10RY43 00						5	0	HR	8					
	26-60	ms	10YR54 00						0	0	HR	5		M			
	60-120	ms	10YR66 74						0	0		0		M			
83	0-20	1ms	10YR43 00						4	0	HR	8					
	20-80	ms	10YR54 00						0	0		0		M			
	80-120	ms	10YR56 00						0	0		0		M			
85	0-20	1ms	10YR43 00						4	0	HR	6					
	20-40	ms	10YR53 00						0	0		0		M			
	40-70	ms	10YR56 00						0	0		0		M			
	70-120	ms	10YR56 74						0	0	HR	10		M			