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Seale Lodge Sandpit Extension, Seale, Nr Farnham, Surrey

Statement of Physical Characteristics

April 1995

STATEMENT OF PHYSICAL CHARACTERISTICS

SEALE LODGE SANDPIT EXTENSION, SEALE, NR FARNHAM, SURREY

1 INTRODUCTION

1 1 In April 1995 6 3 hectares of land at Seale to the east of Farnham in Surrey was surveyed in connection with proposals for mineral extraction and restoration to agriculture ADAS was commissioned by MAFF's Land Use Planning Unit to determine the land quality and site physical characteristics of the land affected by the proposals

1 2 The survey was conducted by members of the Resource Planning Team Guildford Statutory Group at an observation density of approximately one boring per hectare A total of 7 borings and one soil inspection pit were described in accordance with 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 At the time of survey the site was in winter cereals

1 4 The distribution of the grades subgrades and land-use categories is shown on the attached Agricultural Land Classification (ALC) map and the areas and extent 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 may be misleading This map supersedes any previous survey information for the site

Table 1 Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site
3b	6 3	100%
Total area of site	6 3	

1 5 A general description of the grades and land-use categories identified in this survey is provided as an appendix The grades are described in terms of the type of limitation that can occur the typical cropping range and the expected level and consistency of yield

2 CLIMATE

2 1 Climatic criteria are considered first when classifying land since 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 Estimates of climatic variables relevant to the assessment of land quality were obtained by interpolation from a 5 km grid point dataset (Met Office 1989) for a representative location in the survey area

Table 2 Climatic Interpolation

Grid Reference	SU892476
Altitude (m AOD)	100
Accumulated Temperature (°days Jan June)	1416
Average Annual Rainfall	734
Field Capacity Days	155
Moisture deficit wheat (mm)	104
Moisture deficit potatoes (mm)	95

2 3 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall a measure of overall wetness and accumulated temperature as a measure of the relative warmth of a locality In this instance climate does not represent an overall limitation to agricultural land quality In addition no local climatic factors such as exposure or frost risk are significant

2 4 However climatic factors specifically field capacity days and soil moisture deficits do interact with soil factors to influence soil wetness and droughtiness limitations At this locality the climate is relatively dry in regional terms thereby enhancing the likelihood of soil droughtiness problems

3 RELIEF

3 1 The site lies at an altitude of 95-105 m AOD with the land falling gently towards the west Nowhere on the site do relief or gradient affect agricultural land quality

4 GEOLOGY AND SOILS

4 1 British Geological Survey (1978) Sheet 285 Aldershot shows the entire site to be underlain with sandy Folkestone Beds

4 2 Soil Survey of England and Wales (1983) Sheet 6 Soils of South-East England shows the entire site to comprise soils of the Frilford association These soils are described as brown stone-free argillic brown sands which are permeable and well drained (SSEW 1984)

4 3 Detailed field examination of the site indicates the presence of deep well drained sandy soils

5 AGRICULTURAL LAND CLASSIFICATION

5 1 The ALC grading of the site is primarily determined by the interaction between soil and climatic factors giving rise to a soil droughtiness limitation

5 2 Table 1 provides the details of the area and extent of each grade The distribution of grades is shown on the attached ALC map

5 3 The location of the soil observation points is shown on the attached auger boring map

5 4 Subgrade 3b

The entire site has been classified as Subgrade 3b moderate quality land It is restricted in its agricultural use by a severe soil droughtiness limitation Soil profiles typically comprise loamy medium sand or occasionally medium sand topsoils which pass to similar textures and generally become more sandy with depth Commonly the entire subsoil from directly beneath the topsoil to a depth of at least 1 2m was found to be medium sand
Soils are stonefree or occasionally very slightly stony having 2-5% ironstone fragments Occasional profiles were gleyed at depth (75-95 cm) but in general there was no evidence of soil wetness Profiles were assigned to Wetness Class I accordingly
Due to the course textured sandy nature of these soils they retain very little moisture Such soil characteristics combine with the prevailing climate to restrict the availability of soil water for plant growth As a result plants may experience severe drought stress for all or part of the growing season Subgrade 3b is therefore appropriate

6 SOIL RESOURCES

6 1 The following section describes the pattern of topsoil and subsoil resources on the site It provides an illustration of the soil resources available for restoration on the site but it is important to remember when considering these details that soils were sampled to a maximum depth of 120 cm during survey work In some cases soil resources will extend below this depth In general terms all the available existing topsoil and subsoil resources should be retained for restoration purposes

6 2 Topsoil Resource

One topsoil unit was identified It comprises an average 27 cm (with a range of 25 30 cm) of brown or dark yellowish brown (10YR 4/3 or 10YR 4/4) loamy medium sand or occasionally medium sand These topsoils were found to be non-calcareous and generally stonefree Occasional topsoils were very slightly stony containing up to 5% total ironstone fragments

6 3 Subsoils Resource

One subsoil unit was identified It comprises an average 93 cm (with a range of 90-95 cm) of strong brown (7 5YR 5/8 or 7 5YR 4/6) loamy medium sand or more usually medium sand Occasional horizons of sandy clay loam were encountered at depth These subsoils

are well drained Wetness Class I although gleying at depth was observed occasionally Subsoils are non-calcareous throughout and occasionally contain up to 2% ironstone fragments

This subsoil unit has a good structural condition comprising weakly developed coarse subangular blocky peds of friable (where loamy medium sand) to very friable (where medium sand) consistence

ADAS Ref 4003/26/95
MAFF Ref EL40/543

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1978) Sheet 285 Aldershot

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

Meteorological Office (1989) Climatic datasets for Agricultural Land Classification

Soil Survey of England and Wales (1983) Sheet 6 Soils of South East England

Soil Survey of England and Wales (1984) Bulletin 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 religous buildings cemetries 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

[1]The 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 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 **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	**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 **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	**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 appropiate 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 SEALE LODGE SANDPIT Pit Number 1P

Grid Reference SU89104750 Average Annual Rainfall 736 mm
Accumulated Temperature 1411 degree days
Field Capacity Level 155 days
Land Use Cereals
Slope and Aspect 01 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 30	LMS	10YR43 00	0	0						
30- 42	LMS	75YR58 00	0	0			WKCSAB	FR	G	
42-120	MS	75YR58 00	0	2	HR		WKCSAB	VF	G	

Wetness Grade 1 Wetness Class I
Gleying cm
SPL No SPL

Drought Grade 3B APW 75 mm MBW -28 mm
APP 58 mm MBP 37 mm

FINAL ALC GRADE 3B
MAIN LIMITATION Droughtiness

SAMPLE NO	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WETNESS GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	ALC LIMIT	ALC	COMMENTS
1	SU89004760	CER	W	05			1	1	72	-31	49	-46	3B				DR	3B	
1P	SU89104750	CER	W	01			1	1	75	-28	58	-37	3B				DR	3B	
2	SU89104760	CER	S	02	075		1	1	66	-37	49	-46	3B				DR	3B	
3	SU89204760	CER	SW	02	095		1	1	92	-11	56	-39	3B				DR	3B	
4	SU89304760	CER	SW	02			1	1	68	-35	51	-44	3B				DR	3B	
5	SU89004750	CER	W	01			1	1	70	-33	54	-41	3B				DR	3B	
6	SU89104750	CER	W	01			1	1	66	-37	57	-38	3B				DR	3B	
7	SU89254755	CER	W	01			1	1	68	-35	51	-44	3B				DR	3B	

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	ms	10YR43 00						5	0	HR	5						
	28 85	ms	10YR46 00						0	0		0		G				
	85 105	lms	75YR58 00						0	0		0		G				
	105-120	ms	75YR58 00						0	0		0		G				
1P	0-30	lms	10YR43 00						0	0		0						
	30-42	lms	75YR58 00						0	0		0	WKCSAB	FR G				
	42-120	ms	75YR58 00						0	0	HR	2	WKCSAB	VF G				
2	0-25	ms	10YR43 00						0	0		0						
	25-75	ms	10YR64 00						0	0		0		G				
	75 120	ms	10YR73 00	10YR66 00	C		75YR58 00	Y	0	0		0		G				
3	0-28	lms	10YR43 00						0	0		0						
	28 60	ms	10YR64 00						0	0	HR	2		G				
	60-85	lms	75YR58 00						0	0		0		G				
	85-95	ms	75YR46 00						0	0		0		G				
	95-120	scl	10YR62 00	75YR58 00	C			Y	0	0		0		M				
4	0-25	lms	10YR43 00						0	0		0						
	25-120	ms	75YR58 00						0	0		0		G				
5	0-30	lms	10YR43 00						0	0		0						
	30-120	ms	75YR58 00						0	0		0		G				
6	0-26	lms	10YR44 00						0	0		0						
	26-40	lms	75YR58 00						0	0		0		G				
	40-100	ms	75YR58 00						0	0		0		G				
7	0-25	lms	10YR43 00						0	0		0						
	25-120	ms	75YR58 00						0	0		0		G				