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STATEMENT OF PHYSICAL CHARACTERISTICS  
LAND AT DOWNTON MANOR FARM, DOWNTON, HANTS

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## STATEMENT OF PHYSICAL CHARACTERISTICS

### LAND AT DOWNTON MANOR FARM DOWNTON, HANTS

#### 1 BACKGROUND

- 1 1 Land on this 40.95 ha site was inspected on behalf of MAFF between 19-23 October 1992 in connection with mineral extraction proposals. A previous detailed Agricultural Land Classification (ALC) survey had been carried out on the site by MAFF in May 1984 as part of preparation work for the Hampshire Minerals Local Plan. The current survey commissioned by MAFF supersedes the 1984 work which was carried out prior to the revision of the ALC by MAFF in 1988 (MAFF 1988). Details of the soil resources to be found on the site are also included with this recent work.
- 1 2 40 observations were made of soil and site characteristics over the land including 3 soil inspection pits and 37 auger borings using 1.2 m Dutch pattern soil augers. At the time of survey the land was in both arable (mainly maize) and grass use. The results are presented at a scale of 1:10,000. Any enlargement from this scale could be misleading.

#### 2 PHYSICAL FACTORS AFFECTING LAND QUALITY

##### Climate

- 2 1 Climate data for the site was interpolated from a 5 km gridpoint dataset (Met Office, 1989) as follows for representative locations in the survey area.

##### Climate Interpolation

Grid Reference	SZ278927	SZ274933
Altitude (m)	10	25
Accumulated Temperature (deg)	1557	1540
Average Annual Rainfall (mm)	793	807
Field Capacity Days	165	167
Moisture Deficit - wheat (mm)	115	112
Moisture Deficit - potatoes (mm)	111	108

- 2 2 Climatic factors per se place no significant limitation on land quality at the site but the land may be exposed to sea winds particularly from a southwesterly direction. Interactions between soil and climatic factors namely soil wetness and droughtiness are, however, important factors in the assessment of land quality on the site.

##### Relief

- 2 3 The site lies at altitudes of 10-25 m A O D. The majority of the land forms a level or very gently sloping area above 20 m A O D. The land generally falls sharply away towards the valleys forming its southern

and eastern boundaries. Nowhere within the agricultural area of the site do gradients form a limitation in terms of agricultural land quality.

Geology and Soils

- 2 4 The geology of the site is indicated on the 1:25 000 scale solid and drift edition geology map which accompanies Mineral Assessment Report No 122 (IGS 1982). This maps plateau (flint) gravels over the majority of the area with exposures of Headon Beds (grey clays with thin sand partings) on valley slopes to the south and east.
- 2 5 There is no detailed published soil survey of the site. However, the 1:250 000 Soil Map of South East England (SSEW 1983) shows the Efford I soil association as occurring in the vicinity of the site. These soils are described in the legend which accompanies the map as well drained fine loamy soils often over gravel associated with similar permeable soils variably affected by groundwater (SSEW 1983).
- 2 6 Detailed inspection of soils of the site confirm that the majority of soils pass to gravelly and/or coarse textured horizons with depth. The remainder comprise those with clay lower horizons. Topsoils and upper subsoils generally comprise medium clay loam topsoils over progressively heavier (heavy clay loam passing to clay) subsoils. These either remain clayey to 120 cm<sup>+</sup> or pass to gravelly and/or coarse textured horizons. Drainage status varies from wetness class I-IV the majority of the site is well-drained (wetness class I) with more poorly drained soils occurring on lower slopes towards the eastern side of the site. With the exception of land on the northwest and eastern fringes of the site droughtiness is the main factor influencing land quality.

3 AGRICULTURAL LAND CLASSIFICATION

- 3 1 The site is graded 2, 3a and 3b, a breakdown of the grades in terms of area and relative extent is given below.

Grade	Ha	% Agricultural Area
2	10.50	27
3a	20.67	53
3b	7.55	20
Woodland	1.85	
Other non-agricultural land	<u>0.38</u>	
	<u>40.95</u>	

(Total Agricultural Area = 38.72 ha)

Grade 2

- 3 2 Land of this quality occurs towards the north of the site. Associated soils are slightly stony (<5% v/v >2 cm in topsoil but may increase in subsoil) and well drained (wetness class I). Gravel horizons are usually absent within 80 cm. Topsoils are typically medium clay loam in texture passing to permeable subsoils of heavy clay loam which become progressively heavier (ie clay) with depth. Gleying is absent.

within 120 cm but some profiles exhibit slight evidence of drainage impedance (eg manganese concretions or faint mottling in the lower subsoil) The main limitation of this land is slight droughtiness caused by a combination of the fine textures and slight to moderate subsoil stone content

#### Grade 3a

- 3 3 Land mapped as grade 3a comprises two main types of soil Most extensive are those which have slightly stony (<10% v/v) and comparatively shallow upper horizons typically 50-70 cm resting over gravelly and/or coarse textured lower horizons The upper soil profile usually comprises medium clay loam topsoils over medium or heavy clay loam upper subsoils passing to clay which rests upon the gravelly and/or coarse textured horizons referred to above The soils are permeable and well drained (wetness class I) The main limitation to agricultural land quality is moderate droughtiness caused by a combination of coarse textured and gravelly lower subsoils
- 3 4 Less extensive and occurring in the north west and southeastern sectors of the site are soils similar in texture to those graded 2 These have very slightly stony medium clay loam topsoils over deep clayey (heavy clay loam over clay) subsoils They differ from those graded 2 in that they are typically gleyed within 40 cm and slowly permeable from 46-50 cm<sup>+</sup> (wetness class III) Due to a moderate wetness limitation such land is appropriately placed in grade 3a Occasional better drained profiles (WCII) occur sporadically within this mapping unit but are too inextensive to map separately

#### Grade 3b

- 3 5 Grade 3b land is mapped towards the southern end of the site At higher elevations to the west and centre of the site soils comprise shallow stony soils of medium clay loam, medium sandy silt loam or medium sandy loam resting directly over gravel and/or coarse textured sandy horizons High topsoil stone content (15-20% v/v flints >2 cm) limits some sampling locations to grade 3b on topsoil stone content alone due to the impediment this causes to cultivation harvesting and crop growth Elsewhere the stony nature of both upper and lower soil horizons coupled with coarse textures reduces the soil available water capacity and results in a moderate to severe drought-risk
- 3 6 Towards the eastern fringes of the site on lower slopes soils comprise contrasting poorly drained (wetness class IV) clayey soils (medium or heavy clay loam topsoils over gleyed and slowly permeable clays from 28-40 cm) These have a moderately severe wetness limitation and are appropriately placed in grade 3b

#### 4 SOIL RESOURCES

- 4 1 The pattern of soil resources on the site is illustrated by overlays accompanying the coloured ALC plan These, together with the description of soil resources given below provide an indication of the soil resources on the site It should be emphasised that this information should not be viewed solely in the context of soil stripping, but as an illustration of the soil resources available for restoration in the surveyed area

- 4 2 When considering these details it is important to remember that soils were only sampled to a maximum depth of 120 cm during survey work. Useful soil forming resources may occur below this depth.

#### Topsoil

- 4 3 Two topsoil units were identified during survey work based on textural characteristics and stone content.

Topsoil Unit 1 typically comprises a non-calcareous dark greyish brown (10YR 4/2) medium clay loam (occasionally medium silty clay loam or heavy clay loam) with an average depth of 29.2 cm with a recorded range from 25-34 cm. Total stone content is typically less than 10% v/v of flints and usually 5% v/v or less.

Topsoil Unit 2 typically comprises a non-calcareous medium sandy silt loam or medium sandy loam (occasionally medium clay loam), dark greyish brown (10YR 4/2) in colour. The unit has an average depth of 28.6 cm with a recorded range of 25-30 cm. Total stone (flint) content is typically in the range 17-22% v/v with 12-20 v/v > 2 cm.

#### Subsoil

- 4 4 Two main subsoil groupings were distinguished as a result of survey work based primarily upon the depth to gravelly and/or coarse textured subsoil horizons. These have been subdivided on the basis of either drainage status or the texture of upper subsoil horizons.

Subsoil Unit 1 comprises deep non-calcareous clayey materials, mainly heavy clay loam and clays to at least 80-120 cm depth. They may rest over gravelly or coarse textured horizons.

Unit 1A comprises soils as above which are generally permeable and well drained (wetness class 1). Matrix colours are typically brown (10YR 4/3) becoming yellowish brown (10YR 5/4-5/6) with depth. Total stone (flint) content is generally low (5% v/v or less) but at some locations higher contents up to 20% v/v were recorded. Pit 22P (details appended) illustrates this subsoil type.

Unit 1B includes generally deep non-calcareous clayey soils (heavy clay loam passing to clay) which are gleyed at relatively shallow depth, usually within 40 cm and slowly permeable within about 60 cm (wetness class III or IV). Matrix colours are paler than for unit 1A, i.e. brown (10YR 5/3) to pale brown (10YR 6/3) becoming greyish brown (10YR 5/2), light yellowish brown (2.5Y 6/3) and light grey (2.5V 7/2) with depth. Ochreous mottling is common in most horizons.

Subsoil Unit 2 represents shallower upper subsoils over gravelly and/or coarse textured lower horizons, and are separated into 2 sub-units based on the textural characteristics of the upper subsoil.

Unit 2A comprise those subsoils of heavy clay loam or clay texture which pass to gravelly and/or coarse textured horizons between about 50 and 65 cm. Matrix colours of brown (10YR 4/3) and dark yellowish brown (10YR 4/4) are typical. Total stone content is variable between

about 2-17% v/v in the upper subsoil Pit 23P (details appended)  
illustrates this subsoil type

Unit 2B comprise shallow and often stony (up total c 20% v/v) upper profiles to 40-45 cm which rest over gravelly and/or coarse textured lower horizons Due to high subsoil stone contents a number of soils in this group could not be sampled adequately below the topsoil Pit 37P (details appended) illustrates a better quality variant of this soil type

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J Holloway  
Resource Planning Team  
ADAS Statutory Group  
Reading

Sources of Reference

INSTITUTE OF GEOLOGICAL SCIENCES (1982) Mineral Assessment Report 122  
Sand and Gravel Resources of Sheet SU20 SU30 Lymington and Beaulieu  
Hants

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

METEOROLOGICAL OFFICE (1989) Climatological Datasets for Agricultural Land  
Classification

SOIL SURVEY OF ENGLAND AND WALES (SSEW) (1983) Soils of S E England Map  
at 1 250 000 scale and accompanying legend

## DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur typical cropping range and the expected level and consistency of yield. In practice the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

**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 and horticultural crops can usually be grown but on some land in the 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.



### Grade 3 - good to moderate quality agricultural land

Land with moderate limitations which affect the choice of crops timing and type of cultivation harvesting or the level of yield Where 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 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 very severe limitations which restrict use to permanent pasture or rough grazing except for occasional pioneer forage crops

## Descriptions of other land categories used on ALC maps

### 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/airfields 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 land cover types, eg buildings in large grounds and where map scale permits the cover types may be shown separately. Otherwise the most extensive cover type will usually be shown.

## SOIL PIT DESCRIPTION

Site Name : DOWNTON MANOR DOWNTON Pit Number : 22P

Grid Reference: S727409310 Average Annual Rainfall : 793 mm  
 Accumulated Temperature : 1557 degree days  
 Field Capacity Level : 165 days  
 Land Use : Bare Soil  
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 26	MCL	10YR42 00	0	2		
26- 45	HCL	10YR43 00	0	1		MOCSAB
45- 70	C	75YR54 00	0	1		MOCSAB
70-120	HCL	75YR56 00	0	1		MOCSAB

Wetness Grade : 1 Wetness Class : I  
 Gleying : 000 cm  
 SPI : No SPI

Drought Grade : 2 APW : 150mm MFW : 35 mm  
 APP : 116mm MBP : 4 mm

FINAL ALC GRADE : 2  
 MAIN LIMITATION : Droughtiness

## SOIL PIT DESCRIPTION

Site Name : DOWNTON MANOR DOWNTON Pit Number : 23P

Grid Reference: S727509310 Average Annual Rainfall : 793 mm  
 Accumulated Temperature : 1557 degree days  
 Field Capacity Level : 165 days  
 Land Use : Permanent Grass  
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 26	MCL	10YR42 00	2	4		MOCSAB
26- 40	HCL	10YR43 00	0	17		MOCSAB
40- 55	HCL	10YR43 00	0	40		
55- 70	HCL	10YR43 00	0	37		
70- 85	SCL	10YR44 00	0	30		
85-120	LMS	75YR56 00	0	30		

Wetness Grade : 1 Wetness Class : I  
 Gleying : 000 cm  
 SPI : No SPI

Drought Grade : 3A APW : 110mm MBW : -5 mm  
 APP : 95 mm MBP : -17 mm

FINAL ALC GRADE : 3A  
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : DOWNTON MANOR DOWNTON Pit Number : 37P

Grid Reference: S727509280 Average Annual Rainfall : 793 mm  
 Accumulated Temperature : 1557 degree days  
 Field Capacity Level : 165 days  
 Land Use :  
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 27	MCL	10YR42 00	5	7		
27- 45	SCL	10YR32 00	0	20		
45- 60	MSL	10YR32 00	0	5		MOCCAB
60- 70	LMS	75YR46 00	0	5		MOCCAB
70-120	MS	10YR56 00	0	5		

Wetness Grade : 1 Wetness Class : I  
 Gleying : 000 cm  
 SPL : No SPL

Drought Grade : 3A APW : 109mm MEW : -6 mm  
 APP : 96 mm MBP : -16 mm

FINAL ALC GRADE : 3A  
 MAIN LIMITATION : Droughtiness