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STATEMENT OF PHYSICAL CHARACTERISTICS
LAND AT HARBRIDGE, HANTS

RESOURCE PLANNING TEAM
ADAS STATUTORY GROUP
READING

STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT HARBRIDGE HANTS

1. BACKGROUND

- 1.1 Land on this 59.14 ha site was inspected on behalf of MAFF during July 1992 in connection with mineral extraction proposals.
- 1.2 31 observations of soil and site characteristics were made over the site. Auger borings and topsoil stone assessments were made at all 31 locations and at four points soil pits were dug to give more detailed soil descriptions. At the time of survey the whole site, which is divided into two blocks, was in arable use, predominantly wheat but with two areas of linseed to the southeast. Dry soil conditions at the time of survey hampered fieldwork and did not enable all auger borings to be fully described.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

- 2.1 Climate data for the site was interpolated from a 5 km grid dataset (Met. Office, 1989) as follows:

Climate Interpolation

Grid Reference	SU 136107	SU 138110
Altitude	40	45
Accumulated Temperature (deg)	1518	1512
Average Annual Rainfall (mm)	873	876
Field Capacity Days	181	181
Moisture Deficit - wheat (mm)	106	106
Moisture Deficit - potatoes (mm)	100	99

- 2.2 Climatic factors per-se place no limitation on land quality at this site, but do influence interactions between soil and climatic factors, namely soil wetness and droughtiness.

Relief

- 2.3 The site lies on the upper valley slopes of the River Avon at heights generally above 45 m A.O.D. The highest land (50 m A.O.D.) lies to the north of the northern block of land. Overall the land has an easterly aspect with the lowest land (around 30 m A.O.D.) along the eastern boundaries. Gradients on the site are typically 1-2° but increase towards the eastern side and the central valley feature dividing the two blocks of land to a maximum of 4-6°. A very small area of more steeply sloping land (7°) was recorded at the most southerly part of the site adjoining Kent Lane.

Geology and Soils

- 2.4 The published 1:50,000 scale drift edition geology map covering the Harbridge/Bleak Hill area (BGS, 1976) shows the flatter higher ground at Plateau Gravels with Bagshot Sands on the lower and more steeply sloping land. Valley gravels are mapped as occurring on the lowest land (ie around 30 m A.O.D.) towards the eastern fringes of the site.
- 2.5 The published Soils Map of South East England (SSEW, 1983) shows three soil associations mapped in the vicinity of the site, namely the Sonning¹, Hurst and Hucklesbrook Associations. These are predominantly loamy soils over gravel which may be flinty.
- 2.6 Detailed inspection of soils on the site confirm that they comprise flinty light and medium loams, mainly medium sandy silt loams and medium clay loams, over gravel. Drainage is typically free but some soils, particularly on lower land show evidence of groundwater effects or slowly permeable layers. Droughtiness often in combination with high topsoil stone contents form the main limitations to agricultural land quality on the site.

3. AGRICULTURAL LAND CLASSIFICATION

- 3.1 The majority of the site is graded 3b, with the remainder grade 3a with a small area of grade 4. A breakdown of the grades in terms of area and relative extent is given below:

Grade	Ha	% Agricultural Area
3a	13.52	23
3b	44.55	76
4	0.67	1
Non-Agricultural*	<u>0.40</u>	
Total	<u>59.14</u>	

*Agricultural Buildings

Grade 3a

3.2 Land of this quality is mapped in two locations on the site, towards the north of the northern block and on the lower land towards the eastern side of both the northern and southern blocks. These comprise soils which are comparatively less stony and often deeper over the gravel substratum than elsewhere on the site. Topsoils comprise medium sandy silt loam and medium clay loams with a total stone content up to about 20% of flints (3-12% v/v >2 cm). Subsoils are typically of a similar texture, usually with an increasing stone content up to around 20-25% v/v flints (>2 mm). Gravel in a sandy matrix is usually encountered at around 55-65 cm. Occasional soil profiles have a higher clay content in the subsoil (sandy clay loams and heavy clay loams) and these may show some signs of drainage impedance, though are not generally gleyed within 60-80 cm. On the lowest land south of Cobley Farm buildings the subsoils exhibit gleying due to groundwater effects. However, due to their coarse textures they are not considered to be slowly permeable.

3.3 Soil moisture balance calculations indicate that the main limitation of land in this grade is droughtiness caused by comparatively shallow depths of soil over gravel. This may be exacerbated by moderately high stone contents, particularly in the subsoil.

Grade 3b

3.4 Grade 3b land covers the majority of the site. Soils have similar textures to those graded 3a (medium sandy silt loams, medium clay loams and occasionally medium sandy loams) but are typically stonier and may pass to gravel at shallower depths. Topsoil stones contents

(>2 cm in size) may be greater than 15% v/v up to about 30% v/v and high topsoil stone content at some locations is sufficient to downgrade land to a maximum of grade 3b. However, soil moisture balance calculations also indicate that droughtiness in combination with stone contents are the main limitations to agricultural land quality. In particular there is frequently a high percentage of stones in both the topsoil and subsoil less than 2 cm in size which although not considered to significantly impede cultivations do increase the droughtiness of these soils. Total subsoil stone content are frequently in the range 30-50% v/v >2 mm.

At one location in the extreme south of the site moderately steep slopes (7°) adjoining Kent Lane form a further factor which limits land quality in a small part of the application area.

Grade 4

- 3.5 Grade 4 land is confined to a small patch of shallow and very stony soils where topsoils rest directly over gravel. Moisture balance calculations indicate that the soil is very droughty and appropriately placed in grade 4.

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 the soil units 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 soil resources available for restoration in the surveyed areas.
- 4.2 When considering these details it is important to remember that the soils were only sampled to a maximum depth of 120 cm during survey work. Due to the dry soil conditions and the occurrence of indurated gravel layers at the time of survey a detailed examination of the gravel substratum was not possible.

Soil Units

- 4.3 Unit 1 covers 45.6 ha of the site and comprises those soils described in paragraphs 3.3 and 3.4 namely those which are stonier and sometimes shallower over gravel. Pits 24P and 37P (Appendix 1) are typical representatives of this soil unit.
- 4.4 Unit 2 represents the less stony and typically deeper soils on the site. This soil unit is comparatively limited in extent (13.5 ha) and comprises those soils described in paragraph 3.2. Pits 6P and 41P (Appendix 1) are representatives of this soil unit.

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SOURCES OF REFERENCE

BGS (1976). 1:50,000 Scale Drift Edition Geological Map Sheet No. 314 (Ringwood).

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

MET. OFFICE (1989) Climatological Datasets for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Soil Map of South East England (1:250,000 scale).

SOIL PIT DESCRIPTION

Site Name : HARBRIDGE, HANTS

Pit Number : 24P

Grid Reference: SU13701130 Average Annual Rainfall : 873 mm
 Accumulated Temperature : 1518 degree days
 Field Capacity Level : 181 days
 Land Use : Cereals
 Slope and Aspect : 02 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 35	MCL	10YR32 00	22	35		
35- 50	MCL	10YR43 00	0	45		
50-120	GH	00ZZ00 00	0	0		

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

Drought Grade : 3B APW : 063mm MBW : -43 mm
 AFP : 060mm MBP : -40 mm

FINAL ALC GRADE : 3B

MAIN LIMITATION : Droughtiness / Topsoil Stones.

SOIL PIT DESCRIPTION

Site Name : HARBRIDGE, HANTS

Pit Number : 37P

Grid Reference: SU13601090 Average Annual Rainfall : 873 mm
 Accumulated Temperature : 1518 degree days
 Field Capacity Level : 181 days
 Land Use : Wheat
 Slope and Aspect : 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 28	MCL	10YR42 00	12	22		
28- 57	MCL	10YR43 00	0	40		
57-120	GH	00XX00 00	0	0		

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

Drought Grade : 3B APW : 073mm MBW : -33 mm
 AFP : 072mm MBP : -28 mm

FINAL ALC GRADE : 3B

MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : HARRBRIDGE, HANTS Pit Number : 6P
 Grid Reference: SU13601160 Average Annual Rainfall : 873 mm
 Accumulated Temperature : 1518 degree days
 Field Capacity Level : 181 days
 Land Use : Wheat
 Slope and Aspect : degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 28	MSZL	10YR42 00	10	12		
28- 60	MSZL	10YR43 00	0	25		WKFSAB
60-120	GH	00Z200 00	0	0		

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

Drought Grade : 3A APW : 095mm MBW : -11 mm
 APP : 096mm MBP : -4 mm

SOIL PIT DESCRIPTION

Site Name : HARRBRIDGE, HANTS Pit Number : 41P
 Grid Reference: SU14001090 Average Annual Rainfall : 873 mm
 Accumulated Temperature : 1518 degree days
 Field Capacity Level : 181 days
 Land Use : Wheat
 Slope and Aspect : degrees NE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 28	MCL	10YR42 00	5	13		
28- 45	MCL	10YR43 00	0	40		
45- 60	MCL	10YR54 00	0	60	F	
60-120	GH	00Z200 00	0	0		

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

Drought Grade : 3A APW : 87 mm MBW : -19 mm
 APP : 86 mm MBP : -24 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

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.