

A2

NEWINGTON QUARRY, FOLKESTONE

KENT

STATEMENT OF PHYSICAL

CHARACTERISTICS

MAP AND REPORT

MAY 1993

STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT NEWINGTON QUARRY, FOLKESTONE, KENT

1. INTRODUCTION

1.1 During February 1993, 1.5 hectares of land at Newington Quarry, Kent was surveyed in connection with proposals for sand extraction and restoration under the 1981 Minerals Act. ADAS was commissioned by MAFF to determine the land quality and site physical characteristics of the land affected by the proposals.

1.2 The survey was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS at a detailed level of approximately one boring per hectare. A total of 4 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 agricultural use.

At the time of the survey, the land had been ploughed.

1.3 The distribution of grades and sub-grades is shown on the attached ALC map and the areas and extent are given in the table below. The map has been drawn at a scale of 1:2,500. It is accurate at this scale, but any enlargement may be misleading.

Table 1: Distribution of Grades and Sub-grades

	<u>Area (ha)</u>	<u>% total agricultural area</u>
Grade 2	1.1	73.3
3a	0.4	26.7
Total agricultural area	<u>1.5</u>	<u>100.0</u>
<hr/>		
Total area of site	<u>1.5 ha</u>	

1.4 Appendix 1 gives a general description of the grades and land use categories in this 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.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

- 2.1 Climatic criteria are considered first when classifying land since climate can be over-riding 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	TR 174 369
Altitude (m AOD)	66
Accumulated Temperature (°days, Jan-June)	1430
Average Annual Rainfall (mm)	773
Field Capacity Days	162
Moisture deficit, wheat (mm)	114
Moisture deficit, potatoes (mm)	108

- 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 affect soil wetness and droughtiness limitations. At this locality the climate is relatively moist in a regional context, yet moisture deficits are also quite high, thereby increasing the risk of soil droughtiness. This apparent anomaly is due to high evapo-transpiration associated with the coastal influence at this site.

Relief

- 2.5 The site lies at an altitude of 66-67 m AOD, falling very gently towards the north and west. Gradient nor altitude represent limiting factors to agricultural land quality at this locality.

Geology and Soils

- 2.6 British Geological Survey, Sheet 305/306, Folkestone and Dover (1974) shows the site to be underlain by Folkestone Beds which mainly comprise cross bedded sands with minor clay beds.
- 2.7 Soil Survey of England and Wales, sheet 6, Soils of South-East England (1983) maps the Fyfield 2 association at this locality. The accompanying bulletin (SSEW, 1984) describes this association as being "coarse loamy and sandy well drained typical argillic brown earths".

2.8 Detailed field examination of the soils on the site broadly confirms the presence of soils similar to those described by the Soil Survey derived from sandy Folkestone Beds.

3. AGRICULTURAL LAND CLASSIFICATION

- 3.1 The ALC grading of the site is primarily determined by the interaction between soil and climatic factors. The land has been graded very good (grade 2) to good (grade 3a) quality, it being limited by slight droughtiness arising from the interaction of sandy soil textures and relatively high soil moisture deficits.
- 3.2 Table 1 provides details of the area and extent of each grade. The distribution of ALC grades is shown on the attached ALC map.

Grade 2

- 3.3 Land which has been assigned to this grade comprises non-calcareous, stoneless topsoils of sandy clay loam or sandy loam texture. These overlie similar textures in the subsoil, with occasional heavier lenses of clay. Profiles generally tend to become more sandy with depth, typically passing to loamy sand horizons at depths below about 70 cm. Soil profiles are non-calcareous and free of stones throughout, although impenetrable soft sandstone was encountered at one observation point. This was not thought to be typical of the mapping unit however. Profiles are well drained, wetness class I and are very slightly limited by the risk of soil droughtiness. The sandy soil textures combine with relatively high soil moisture deficits to give rise to soils with reserves of available water which may not meet the requirements of the most demanding crops. The land is capable, however of supporting a wide range of arable and horticultural crops.

Grade 3a

- 3.4 A small unit of land towards the north of the site has been assigned to this grade. It is associated with soils similar, but more sandy, to those described above. Profiles were found to comprise non-calcareous, stoneless, sandy loam topsoils, overlying sandy clay loam in the upper subsoil and passing to loamy sand around 50 cm depth. Soils are well drained, wetness class I, and are limited by droughtiness. The higher sand content of these profiles give rise to a greater risk of droughtiness when combined with the effects of climatic factors, such that grade 3a is appropriate.

4. SOIL RESOURCES

Soil Units: Consideration for Restoration

4.1 The following section describes the soil resources available on the site. Soil resource maps accompanying this report illustrate the pattern of topsoil and subsoil resources on the site. It should be emphasised that these are not soil stripping maps, but merely an illustration of the soil resources available for restoration on the site. When considering these details it is important to remember that soils were sampled to a maximum depth of 120 cm during survey work. In some cases soil resources will extend below this depth.

4.2 Topsoils

One topsoil unit was identified. It comprises an average 28.3 cm of brown or dark greyish brown (10YR 4/3 or 10YR 4/2) medium sandy loam or sandy clay loam. These topsoils were found to be non-calcareous and stoneless.

This unit covers an area of 1.5 ha and there is 4245 m³ of topsoil available for restoration.

4.3 Subsoils

Two subsoil units were identified.

Unit 1

This unit corresponds with the area assigned to grade 3a which is slightly more sandy than the rest of the site. It comprises an average 21 cm of sandy clay loam over 70 cm of loamy medium sand. Upper subsoils are dark yellowish brown (10YR 4/4) whilst the loamy sand lower subsoils are light olive brown (2.5Y 5/3-5/4). These subsoils are not stony and non-calcareous. They show no evidence of drainage imperfections and are well aerated and rooted.

Due to the limited extent of this subsoil unit, the structural condition of the unit was not assessed. Information from the adjoining subsoil unit (as described below) suggests, however, that moderately good structures are likely to be typical of this unit.

Unit 2

This unit comprises an average 49.7 cm of sandy clay loam or clay in the upper subsoil overlying a further 43.3 cm of medium sandy loam or loamy medium sand in the lower subsoil. Upper subsoils tend to be brown (10YR 5/3 or 10YR 4/3) or light olive brown (2.5Y 5/4) in colour, whilst lower subsoils are light olive brown (2.5Y 5/4). This subsoil unit is non-calcareous and stoneless, although impenetrable medium soft sandstone was found to occur at one observation point. Profiles are well drained, very porous and well rooted.

This subsoil unit has moderately good structures in the upper subsoil (sandy clay loam textures), it being composed of moderately well developed, very friable, coarse angular blocky peds. The lower subsoil (medium sandy loam texture) was found to be of good structure comprising weakly developed coarse angular blocky peds of very friable consistence.

The pit described at Appendix III is typical of this subsoil unit.

4.4 Table 3: Subsoil Resources

	Topsoil	Subsoil		Total Soil resource
		1	2	
Average depth (cm)	28.3	91.0	93.0	
Area (ha)	1.5	0.4	1.1	
Volume (m ³)	4245	3640	10,230	18,115 m ³

May 1993
 ADAS Ref: 2010/007/93
 MAFF Ref: EL 20/00189

Resource Planning Team
 Guildford Statutory Group
 ADAS Reading

SOURCES OF REFERENCE

- BRITISH GEOLOGICAL SURVEY (1974) Sheet 305/306. Folkestone and Dover.
- 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 SUB-GRADES

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 on 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. When more demanding crops are grown yields are generally lower or more variable than on land in grades 1 and 2.

Sub-grade 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.

Sub-grade 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 very 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 : 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.

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.

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 90 days, but not wet within 40cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 180 days, but only wet within 40cm depth for 31-90 days in most years.

Wetness Class IV

The soil profile is wet within 70cm depth for more than 180 days but not wet within 40cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80cm depth, it is wet within 40cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40cm depth for more than 335 days in most years.

(The number of days is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.)

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS		
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR
1	0-29	msl	10YR43 00					0	0	0				
	29-50	sc1	10YR44 00					0	0	0			M	
	50-120	lms	25 Y53 54					0	0	0			M	
2	0-27	sc1	10YR43 00					0	0	0				
	27-60	c	10YR53 00					0	0	0			M	
	60-70	sc1	25 Y54 00					0	0	0			M	
	70-90	lms	25 Y54 00					0	0	0			M	
	90-100	msl	25 Y54 00					0	0	0			G	
	100-120	lms	25 Y54 00					0	0	0			M	
3	0-28	msl	10YR42 00					0	0	0				
	28-45	c	10YR43 00					0	0	0			M	
	45-120	msst						0	0	0			P	Imp 45+, sandstone
4	0-29	msl	10YR42 00					0	0	0				
	29-60	sc1	10YR43 00					0	0	0			M	
	60-70	c	10YR43 00					0	0	0			M	
	70-80	sc1	25 Y54 00					0	0	0			M	
	80-120	msl	25 Y54 00					0	0	0			G	
4P	0-29	msl	10YR42 00					0	0	0				
	29-60	sc1	10YR43 00					0	0	0	MDCDAB	VF	M	
	60-80	sc1	25 Y54 00					0	0	0	MDCDAB	VF	M	
	80-120	msl	25 Y54 00					0	0	0	WKCOAB	VF	G	

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M. REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	TR17463699	PLO W	2		1	1	114	0	95	-13	3A			DR	3A
2	TR17453694	PLO W	2		1	1	133	19	114	6	2			DR	2
3	TR17463685	PLO N	1		1	1	90	-24	82	-26	3B			DR	3B Imp 45+
4	TR17473687	PLO N	1		1	1	161	47	112	4	2			DR	2
4P	TR17473687	PLO N	1		1	1	163	49	111	3	2			DR	2

SOIL PIT DESCRIPTION

Site Name : NEWINGTON QUARRY, KENT Pit Number : 4P

Grid Reference: TR17473687 Average Annual Rainfall : 773 mm
 Accumulated Temperature : 1430 degree days
 Field Capacity Level : 162 days
 Land Use : Bare Soil
 Slope and Aspect : 1 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 29	MSL	10YR42 00	0	0		
29- 60	SCL	10YR43 00	0	0		MDCOAB
60- 80	SCL	25 Y54 00	0	0		MDCOAB
80-120	MSL	25 Y54 00	0	0		WKCOAB

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

Drought Grade : 2 APW : 163mm MBW : 49 mm
 APP : 111mm MBP : 3 mm

FINAL ALC GRADE : 2
 MAIN LIMITATION : Droughtiness