AGRICULTURAL LAND CLASSIFICATION

MEDWAY GAP AND VICINITY LOCAL PLAN:

LAND AT EDEN FARM/BROADWATER FARM, WEST MALLING

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1. BACKGROUND

1.1 Two sites at West Malling in the vicinity of Eden and Broadwater Farms were surveyed in detail on 14 and 15 January 1991 in connection with objections to the Medway Gap and Vicinity Local Plan.

1.2 The soils in both areas were inspected at roughly 100 m intervals using 110 cm and 120 cm Dutch soil augers. A number of soil inspection pits were dug to provide additional soil data. The land was graded in accordance with the Revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988).

SUMMARY OF RESULTS

1.3 The results of the survey work are presented visually in the accompanying maps. A breakdown of the Agricultural Land Classification grades in terms of area and extent is provided below:

A. EDEN FARM

	Ha	%
Grade 1	13.4	71
2	3.6	19
3a	1.4	8
3b	0.3	2
Total Agricultural area	18.7	100%
Urban	1.3	

B. Broadwater Farm

	Ha	%
Grade 1	11.3	23
2	12.7	26
3a	9.9	21
3b	14.2	30
Total agricultural area	48.1	100
Not surveyed)	15.9	
Land in non-agricultural use)		

LAND AT EDEN FARM, WEST MALLING

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climate data for the site was obtained by interpretation from a 5 km gridpoint data set produced by the Met. office (1989). The climatic parameters derived from this are as follows:

Grid Reference TQ 686573 Altitude 45 m A.O.D.

Accumulated Temperature (day°C)	1456
Average Annual Rainfall (mm)	670
Field Capacity Days	138
Moisture deficit - wheat (mm)	115
- potatoes (mm)	110

2.2 The most important parameters in assessing an overall climatic limitations are average annual rainfall (a measure of overall wetness) and accumulated temperature (a measure of the relative warmth of a locality). Climatic factors per se place no limitation on land quality on this site but do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Relief

2.3 The site lies at altitudes of around 35-55 m A.O.D. and has overall gentle falls in a northerly direction. With the exception of a small steep bank towards the north east corner of the site, gradient is not a factor adversely influencing land quality at this location.

Geology and Soils

2.4 The site lies at the boundary between two published geological map sheets nos. 287 (Sevenoaks) and 288 (Maidstone) (Brit. Geol. Surv. 1971, 1976). These indicate that the solid geological formations comprise the Hythe Beds and Sandgate Beds, both representatives of the Lower Greensand formation. The Hythe Beds are essentially sandy with harder beds of sandy limestone ("Rag") and sandstone. These pass upwards to the Sandgate Beds, which are more clayey in composition, and are mapped on the higher land on the site. However, superficial coverings of head brickearth, probably about 5-10 feet thick, form the main soil forming material. The head brickearth comprises a relatively uniform yellow-brown to buff coloured silty deposit.

2.5 The soils of the Southeast of England have been mapped at a scale of 1:250,000 by the Soil Survey of England and Wales (1983). Soils on the site are mapped as belonging to the Malling Association. This is described in the legend accompanying the map as "well drained non-calcareous fine loamy soils over limestone at variable depths. Some deep well drained coarse loamy soils and similar fine loamy over clayey soils. Some fine loamy soils with slowly permeable subsoils and slight waterlogging. Occasional shallower calcareous soils over limestone". The soils are similarly described in the 1980 Soil Survey Publication "Soils of Kent" (SSEW, 1980).

2.6 Detailed examination of soils on the site indicate that the majority comprise deep non-calcareous to slightly calcareous well drained fine sandy silt loams, silt loams or medium clay loams/silty clay loams overlying similar textured subsoils derived from head brickearth deposits. At some locations the immediate or lower subsoil comprises a

greenish coloured sandy clay loam or sandy clay which may contain pockets of sand. This is believed to represent the thinning of the brickearth over the underlying Sandgate Beds. Due to the less permeable nature of this subsoil these soil variants are typically slightly less well drained.

2.7 West of Eden Farm shallow medium clay loams rest over weathered ragstone believed to derive from the Hythe Beds. The topsoil and upper subsoils are only very slightly stony but rest (at about 50 cm) on a brashy ragstone layer containing about 50-70% of stone in medium clay loam matrix. Doughtiness limitations are the main factor influencing land quality.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The area and extent of the ALC grades mapped on the site is given below:

	Ha	%
Grade 1	13.4	71
2	3.6	19
3a	1.4	8
3b	0.3	2
Total agricultural land	18.7	100
Urban	1.3	

Grade 1

3.2 Land of this quality is mapped over the majority of the site and comprises deep well drained (wetness Class I) non-calcareous to slightly calcareous sandy silt loams, fine sandy silt loams and medium clay loam topsoils over similar textured subsoils. These soils have good reserves of available water and no significant limiting factor affects their potential agricultural or horticultural use.

3.3 It is believed that a small area within the Grade 1 mapping unit towards the extreme northeast corner of the site may have been disturbed (by land-filling?) However, the area thought to be involved is very limited and no detailed inspection was made.

Grade 2

3.4 Grade 2 land occurs in the vicinity of Eden Farm and the converted Oast Houses. Soils in this area have a similar upper profile to those graded 1 above, but pass into a sandy clay loam and for sandy clay lower subsoil. Occasionally pockets of sandier material also occur. The soils are typically gleyed in the lower subsoil and fall into either wetness Class I or II depending upon depth to gleying and occurrence of slowly permeable horizons. Minor wetness and/or drought limitations resulting from the presence of a heavier textured and/or sandier lower subsoil are the main limitations to land quality.

Grade 3a

3.5 Land grade 3a is associated with a limited area of relatively shallow soils developed over brashy ragstone lying to the north and west of Eden Farm. The soils (topsoil and upper subsoil) are of medium clay loam texture with a low stone content. These rest over brashy ragstone layers in a medium clay loam soil matrix. Moderate droughtiness caused by the predominance of ragstone in the lower subsoil is the main limitation to agricultural land quality.

Grade 3b

3.6 A small area of 3b land occurs where gradients in excess of 7° are found. This is the location of a small steep bank, rising to the south and east.

LAND AT BROADWATER FARM, WEST MALLING

4. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

4.1 Climate data for the site was obtained by interpolation from a 5 km gridpoint dataset produced by the Met. Office (1989). The climatic parameters derived from this are as follows:

Grid Reference	TQ 675565	TQ 682562
Altitude (m.A.O.D.)	66	72
Accumulated Temperature (day °C)	1433	1426
Average Annual Rainfall (mm)	675	674
Field Capacity Days	139	139
Moisture Deficit - wheat (mm)	112	112
- potatoes (mm)	105	105

4.2 The most important parameters in assessing an overall climate limitation are average annual rainfall (a measure of overall wetness), and accumulated temperature (a measure of the relative warmth of a locality). Climatic factors per-se place no limitation on land quality at this site but do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Relief

4.3 The site is divided into two blocks of land by the A228 West Malling By-Pass. In general terms the land has overall northerly falls, with the highest land in the vicinity of the former Kings Hill Hostel and West Malling Airfield at around 76-84 m A.O.D. The lowest land on the site occurs on the north-western side adjoining St. Leonard's Street at an altitude of around 60 m A.O.D. The land has overall gentle falls with the exception of a small incised valley feature east of the former Kings Hill Hostel.

Geology and Soils

4.4 The block of land west of the West Malling By-Pass is shown on the published Geological Map Sheet No. 287 (Sevenoaks) (I.G.S., 1971) as predominantly Hythe Beds with a superficial covering of head brickearth towards the north east. The eastern block has a more varied geology with a sequence of Lower Greensand deposits from Folkestone Beds forming lower land, Sandgate Beds, and Hythe Beds forming the higher ground. Superficial coverings of head (brickearth and angular chert drift) mask some of these solid deposits. The IGS map head brickearth towards the north of the site on lower slopes and the angular chert drift (head) along the southern boundary.

4.5 The soils of the Southeast of England have been mapped at a scale of 1:250,000 by the Soil Survey of England and Wales (1983). The soils of the site are shown as belonging to the Malling and Marlow soil associations. The former type covers the majority of the site and is described in the accompanying legend as "deep well drained non-calcareous fine loamy soils over limestone at variable depths. Some deep well drained coarse loamy soils and similar fine loamy over clayey soils. Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Occasional shallower calcareous soils over limestone."

4.6 The Marlow soil association which is mapped (SSEW, 1983) at the extreme southern of the site is described in the accompanying legend as "well drained fine loamy over clayey and clayey soils. Some coarse and fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging". The soils are also similarly described in the 1980 Soil Survey Publication "Soils of Kent" (SSEW, 1980).

4.7 Detailed inspection of the soils on the site, indicate that the majority are derived from the Hythe Beds formation and comprise well drained (wetness class I) fine sandy silt loam, medium clay loam, or sandy clay loam topsoils overlying similar subsoils which pass into brashy ragstone in a soil matrix at variable depths from 30-90 cm+.

Droughtiness in combination with high contents of hard brashy sandstone material within the topsoil at some locations are the main limitations in terms of agricultural land quality. Some of the stonier soil variants to the north of West Malling airfield may be also influenced by stony head deposits.

4.8 Soils believed to be derived from head brickearth deposits occur south of St. Leonard's Farm and also on either side of the A228 By-Pass running westwards from New Barns. These typically comprise deep well drained (wetness class I) fine sandy silt loams which may pass to medium clay loams or sandy clay loams with depth.

4.9 The remaining soils on the site tend to be deep sandy clay loams, coarser medium sandy loams over loamy sands, or sandy loams over loamy sands, or sandy loams and fine sandy loams over clay. These soils are believed to be derived from either the sandy Folkestone Beds or the more clayey Sandgate Beds. Drainage status varies from wetness class I to III depending upon permeability. Droughtiness is also a limiting factor at most locations.

5. AGRICULTURAL LAND CLASSIFICATION

5.1 The area and extent of the ALC grades mapped on the site is given below:

		Ha	%
Grade	1	11.3	23
	2	12.7	26
	3a	9.9	21
	3b	14.2	30
Total agricultural area surveyed		48.1	100
Woodland, non-agricultural land, urban, not surveyed		15.9	

Non-agricultural areas comprise either woodland (mainly an eastern block of land) or vacant land, formerly the site of Kings Hill Hostel which lies to the west of the A228 By-Pass. Land not surveyed mainly comprises an area of very overgrown, vacant land, some of which was formerly orchards. It also includes an area of land at the junction of Windmill Lane and the A228 By-Pass which, at the time of survey, appeared to be subject to some form of engineering operations.

Grade 1

5.2 Land graded 1 is believed to be associated with pockets of superficial head brickearth deposits. Soils typically comprise deep well drained (wetness class I) fine sandy silt loams which may pass to medium clay loams or sandy clay loams at depth. The soils have good reserves of available moisture and are easy working. No significant limitation affect this land which is capable high yields of a range of agricultural and horticultural crops.

Grade 2

5.3 Land of this quality is mainly confined to the north of the site with the exception of an area west of Hoath Wood. The associated soils are of three main types. Firstly are moderately deep soils formed over ragstone. These are well drained (wetness class I) soils with medium silty clay loam, silt loam or fine sandy silt loam topsoils overlying sandy clay loam or silty clay loam subsoils which may subsequently pass to sandy clay or silty clay with depth. Ragstone layers are typically encountered from 65-75 cm and these result in a reduced moisture holding capacity and consequently a minor limitation due to drought.

5.4 The second soil type within this grade comprises deep soils having either medium sandy loam or sandy clay loam topsoils over either sandy clay loam to depth or a heavier clay lower subsoil. Such soils have a variable drainage status ranging from wetness classes I and II (or III were topsoils are medium sandy loams) depending upon presence and depth to gleying and slowly permeable horizons. In addition to minor wetness limitations as outlined above, these soils are also limited to grade 2 by a minor drought limitation.

5.5 The remaining soils are similar to those described for grade 1, but have a topsoil stone content of 5-8% v/v of hard stones (> 2 cm) which precludes them from attaining the higher grade.

Grade 3a

5.6 Land of this quality comprises moderately shallow soils over brashy ragstone. Topsoils are medium clay loams or fine sandy silt loams over sandy clay loam subsoils, passing into increasingly brashy ragstone layers at 50-60 cm+. Most land of this quality is limited by droughtiness due to the predominance of brashy layers in the lower subsoil. However, some deeper varieties are also included in grade 3a where surface stone contents (mainly ragstone) of 10-12% v/v (>2 cm) will hinder cultivations and preclude a higher grade being achieved.

Grade 3b

5.7 Grade 3b land covers a relatively small area near the former Kings Hill Hostel to the west of the A228 By-Pass together with more substantial area to the east. The soils typically comprise fine sandy silt loams, medium clay loams, and medium silty clay loams overlying either similar subsoils or sandy clay loams and sandy clays. These in turn pass to brashy ragstone layers from 30-40 cm. The surface is brashy, typically with 16-25% v/v of hard stones >2 cm, with stone content increasing with depth. The land is well drained (wetness class I), but the high surface stone contents and the predominance of ragstone brash in the immediate subsoil causes this land to be both potentially droughty and have limitations associated with the high surface stone contents. This high topsoil stone volume will act as an impediment to cultivation, harvesting and crop growth.

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SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1971) Solid and Drift Edition geological map sheet no. 287 (Sevenoaks); 1:63360 scale.

BRITISH GEOLOGICAL SURVEY (1976) Solid and Drift Edition geological map sheet no. 288 (Maidstone) 1:63360 scale.

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METEOROLOGICAL OFFICE (1979) Climatological Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1980) Soils of Kent. Soil Survey Bulletin No. 9 (and maps at 1:250,000 scale).

SOIL SURVEY OF ENGLAND AND WALES (1983) Soils of South East England (map at 1:250,000 scale and accompanying legend).

APPENDIX I

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: golf courses, 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.

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 revised soil wetness classes (Hodgson, in preparation) are identified and are defined in Table 11.

Table 11 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 not wet within 40 cm depth for more than 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 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 and 90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer 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.

[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.

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.