

**Appendix 19: Agricultural land quality and soil resources at
Jeskyns Farm Cobham**

**AGRICULTURAL LAND QUALITY AND
SOIL RESOURCES AT
JESKYNS FARM COBHAM**

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1.0 SUMMARY

- 1.1 A survey of soils has been undertaken of the 148 ha of agricultural land of Jeskyn's Farm, which lies between Cobham, Kent and the Channel Tunnel Rail Link.
- 1.2 A complex range of soil types covers the land, though mainly giving rise to land of good growing quality.
- 1.3 Recent use has been for agriculture with crops of oilseed rape and wheat dominant in 2005. Two fields are in other use. The southernmost field is in ley grassland and the easternmost field has been sown to wildflowers, dominated by cornflowers. The agricultural quality is generally good with land mainly of grades 1 (16%) and 2 (71%). Poorer quality land occurs where soils are stony or have slowly permeable layers at shallow depth.

Introduction

This report provides information on the agricultural quality and soil resources of 148 ha of land that lies north and west of the village of Cobham, near Gravesend in Kent. The land, known as Jeskyn's Farm is centred on grid reference TQ661691.

SITE ENVIRONMENT

The farm extends from the bridge taking Henhurst Road over the Channel Tunnel Rail Link, south and east to the edge of Cobham and Ashenbank Wood. It continues south of Jeskyn's Road to the edge of Round Street. The land is fairly flat in the south at around 70 m AOD but becomes more rolling to the north as it rises via slopes of up to 5° to over 100 m AOD.

The underlying geology (BGS 1: 50,000 Sheet 271) is Thanet Sands and Upper Chalk. The Thanet Sand formation, which comprises fine-grained sandy and silty beds, occupies the upper slopes and hill tops in the north and east of the farm, and is shown as thinly covering most of the land south of Jeskyn's Road. Upper Chalk occupies the lower parts of the landscape but is almost everywhere covered by head deposits.

LAND USE

The land has been in agricultural use for many decades. A map of 1869 shows similar fields to current ones, though with some subsequent removal of small woodland strips and field amalgamation. A 4 ha wood (Court Wood) on Winstead Hill and some small orchards by the Henhurst properties have also been removed in the intervening years.

For 12 years up until the 2005 harvest the land was contract farmed by Clements Reach Farm, Meopham as part of an all arable farming operation of 1,200-1,500 ha. In recent years the rotation has been two wheat crops followed by oilseed rape but peas were also part of the rotation until 2002. Wheat yields ranged from 8 tonnes/ha on the poorer land to 10 tonnes/ha on the better land. Rape yields were 3.5-4 tonnes/ha. Two fields were in other uses in autumn 2005. The southernmost field had been sown to ley grassland and the easternmost field had

been sown to wildflowers, dominated by cornflowers.

CTRL CONSTRUCTION

An area of land of just over 3 ha was temporarily taken from the farm in the late 1990s during construction of the Channel Tunnel Rail Link under contract 330. It was used during construction of the new overbridge for Henhurst Road and for access to the route of the rail link. Before works commenced, existing topsoil and subsoil were stripped off this area and stored peripherally. At the completion of works the land was re-graded into the undisturbed field to the south using a minimum 700 mm of subsoil and 300 mm of topsoil. During this operation, clayey subsoils that had been stripped were, in most places, replaced with lighter-textured Thanet Beds material excavated nearby from the CTRL route. Most works were finished by early 2000 though a strip alongside the CTRL was used as a haul road and not restored until spring 2001. The whole area has been subsequently drained and subsoiled.

SURVEY

The information that follows is based on a survey carried out during September 2005. This involved the inspection of soil and land characteristics at the alternate intersections of a 100 m grid (see Map 3), located to ± 5 m using GPS equipment and giving an inspection density of 1 per 2 ha. Most locations were inspected by shallow pit and auger to 110 cm depth, but dry soil and stones prevented deep augering in about a quarter of the locations. Occasional locations (e.g. no 48) were moved to a location where the auger could penetrate. Additionally, five trial pits were machine dug to a depth of 1.5 m for more detailed description and sampling of the main land types.

Additionally, samples of topsoil were collected from individual fields or from within-field areas (Map 4). These were analysed for plant nutrient content and the results are shown in Appendix 2.

Agricultural land quality

To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use for food production. The Agricultural Land Classification (ALC) system¹ classifies land into five grades numbered 1 to 5, with grade 3 divided into two sub-grades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988. The provisional agricultural land quality map of the South Eastern Region at a scale of 1:250,000 shows the whole of Jeskyn's farm as grade 1, within an area of mixed grade 1 and grade 2 land extending south-west from Rochester as far as Meopham. However the map was not only based on reconnaissance survey but the 1960s version of the classification.

The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the *Climatological Data for Agricultural Land Classification*². The relevant data for the locality is given below. Climatically, the land is in a relatively warm and dry part of England with no limitation to agricultural quality.

- | | |
|--|-----------------------------------|
| • Average annual rainfall: | 636 mm |
| • January-June accumulated temperature >0°C | 1412 day° |
| • Field capacity period (when the soils are fully replete with water) | 125 days early Dec-late Mar |
| • Summer moisture deficits for: | wheat: 114 mm potatoes: 108 mm |

Grades 1 to 3b were identified on the farm (Map 1). The difference from the published reconnaissance maps reflects the greater weight placed on summer soil moisture deficits in the revised 1988 classification and the identification during

¹ *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*. MAFF, 1988.

² *Climatological Data for Agricultural Land Classification*. Meteorological Office, 1989

this survey of areas of shallow gravelly soil and soils with slowly permeable layers. The individual grades are described below.

GRADE 1

This grade occupies just 16% of the farm on the valley floors north of the farm buildings and alongside the wood in the north-east. This is where the deep brown silty soils occur (see next section on Soil Resources), developed in deep head and hillwash deposits. These soils are permeable to depth (wetness class I), have few or no stones and are highly water retentive. This combination of properties makes them easy to cultivate, drought resistant and consequently suitable for a wide range of cropping. There are also small areas of grade 1 land included within the area shown as Grade 2 on Map 1.

GRADE 2

This is the dominant land grade accounting for over 70% of the farm. It comprises land downgraded from grade 1 because poorly structured layers in the deeper subsoil, stoniness or sandy layers reduce the available water capacity, resulting in a slight droughtiness limitation. In places the combination of slight wetness (wetness class II) and surface texture is also limiting. Where soils are fine sandy, capping and plough pans result in reduced permeability, and rill and gullies readily develop on the slopes when heavy rainfall falls between sowing and full crop cover. Some of the same soils, however, are borderline to grade 1.

GRADE 3

Sub-grade 3a

There are small areas in the south of the farm where drift deposits are heavier in texture than elsewhere and topsoils are heavy clay loams. This reduces the flexibility for cultivation and limits the land to sub-grade 3a. In places there is a slowly permeable layer close enough to the surface to give a wetness class of III and small areas of sub-grade 3b.

Sub-grade 3b

There is a small area of this land towards the north of the farm where there is a ridge of gravel that gives rise to very stony soils that are freely draining but agriculturally-limited by droughtiness.

The areas occupied by each grade are in the table below:

| <i>Grade/subgrade</i> | <i>Area (ha)</i> | <i>Percentage of farm</i> |
|------------------------------|-------------------------|----------------------------------|
| Grade 1 | 23.9 | 16 |
| Grade 2 | 105.5 | 71 |
| Sub-grade 3a | 10.5 | 7 |
| Sub-grade 3b | 7.2 | 5 |
| Uncultivable | 1.5 | 1 |
| TOTAL | 148.6 | 100 |

Soil Resources

Five main soil units have been identified and these are shown on Map 2. Topsoils are everywhere loamy or silty and have been ploughed to 25-30 cm depth, but vary in stoniness. Subsoils vary significantly in texture and permeability.

Deep silty soils

These soils are the basis of the grade 1 land. Topsoils have a high silt content, though varying in texture from silt loam to sandy silt loam and clay loam. The subsoils are brown stoneless silty clay loams, relatively dense but with abundant medium and coarse worm channels that help to maintain a good permeability. A description from one of the trial pits is:

- | | |
|-----------|--|
| 0-27 cm | Dark yellowish brown (10YR 3/4) clay loam; 2% small and medium rounded pebbles and subangular flints; moderately developed medium and fine subangular blocky structure; friable; 5% macropores; common fine fibrous roots; non-calcareous; sharp wavy boundary to: |
| 27-74 cm | Strong brown (7.5YR 4/6) silty clay loam, stoneless; moderately developed medium prismatic structure with dark yellowish brown (10YR 4/4) ped faces; firm; 10% macropores, mainly medium and coarse worm channels; a few fine fibrous roots; non- calcareous; gradual boundary to: |
| 74-150 cm | Strong brown (7.5YR 4/6-5/6) silty clay loam, stoneless; weakly developed adherent coarse prismatic structure with brown (7.5YR 4/4) ped faces; becoming massive below 1 m; firm; 5% macropores, all medium and coarse worm channels extending at least to 1m depth; very slightly calcareous in places. |

Fine sandy soils

These occupy the convex slopes of the more rolling landscape in the north and east of the farm where the substrate is the sandier facies of the Thanet Sand Formation. Topsoils and subsoil are very slightly stony fine sandy loams, sandy silt loams or, occasionally, sandy clay loams, with clay content seldom exceeding about 20%. Ochreous mottles are normally evident with increasing depth and grey-mottled layers usually occur within 1 m of the surface. A typical soil description from a trial pit is:

- | | |
|----------|--|
| 0-29 cm | Dark brown (10YR 3/3) fine sandy loam; 1% small and some medium rounded pebbles; weakly developed very coarse subangular blocky structure; firm; 2% macropores; common fine fibrous roots; non- calcareous; sharp even boundary to: |
| 29-68 cm | Dark yellowish brown (10YR 4/4) fine sandy clay loam; 1% medium rounded pebbles; weak adherent coarse prismatic structure; firm; 2% macropores; common fine fibrous roots, mainly on structure faces; non- calcareous; clear even boundary to: |

68-105 cm Yellowish brown (10YR 5/4) fine sandy clay loam with common yellowish brown (10YR 5/8) and a few brown (10YR 5/3) mottles; stoneless; weak adherent very coarse prismatic structure; firm; 2% macropores; a few fine fibrous roots; non-calcareous; gradual even boundary to:

105-150 cm Grey-mottled fine sandy loam to sandy silt loam.

Loamy mottled soils

These occur extensively on lower slopes in the central and southern parts of the site where there is a varying depth of drift or thin Thanet Beds residuum over Upper Chalk. There are occasional shallow depressions where, in the past, chalk was probably dug for liming the fields; small stones of added chalk are common in some of the soil profiles. Topsoils are usually clay loams with up to 5% flints and pebbles. The upper parts of the subsoil are clay loams, brown with occasional ochreous mottles. With increasing depth the subsoil becomes heavier, sometimes clayey, and grey-mottled. A description from a trial pit is below.

0-32 cm Dark brown (10YR 3/3) heavy clay loam; 5% small rounded pebbles, medium flints and rare very small chalk stones, probably added; weakly developed coarse subangular blocky structure; very firm; 2% macropores; common fine fibrous roots; non-calcareous; sharp wavy boundary to:

32-60/70 cm Dark yellowish brown (10YR 4/4) heavy clay loam to clay; 5% medium flints with a few small rounded pebbles and very small chalk stones; weakly developed medium prismatic structure breaking to coarse subangular blocky; firm; 2% macropores; a few fine fibrous roots; non-calcareous; undulating boundary to:

60/70-125 cm Olive brown (2.5Y 3/4) clay, passing downwards to heavy clay loam; common fine greyish brown (2.5Y 5/2) and a few strong brown (7.5YR 5/6) mottles; occasional dark brown (7.5YR3/4) patches; 5% medium and large flints, mainly at base of layer; weakly developed very coarse prismatic structure; very firm; 1% macropores; a few fine fibrous roots; non-calcareous; sharp irregular boundary to:

125+ cm Hard chalk

Gravelly soils

In the central northern part of the site there is a band of gravelly drift up to 150 m wide and about 500 m long that gives rise to the sub-grade 3b land. Topsoils are loamy but contain 10-15% small pebbles, 20-25% in the stoniest areas.

Underneath is a thin subsoil, again loamy but with 25-40% small and medium pebbles. Within 40-50 cm of the surface gravel is encountered, though there are loamy and clayey inclusions locally within it. A typical profile is:

0-30 cm Dark brown (10YR 3/3) sandy silt loam; 13% small and some medium rounded pebbles; moderately developed fine, medium and coarse subangular blocky structure; friable; 2% macropores; common fine fibrous roots; non-calcareous; sharp wavy boundary to:

- 30-44 cm Dark yellowish brown (10YR 4/4) sandy silt loam, 43% small and medium rounded pebbles; stone-dominated structure; friable; 3% macropores; common fine fibrous roots; non- calcareous; gradual boundary to:
- 44-120 cm Dark brown (7.5YR 4/4) medium sandy loam, stoneless; 50% small and medium rounded pebbles; stone-dominated structure; friable; rare macropores; a few fine fibrous roots extending to 1m depth; non- calcareous. Irregular lobes of loamy material and tongue of mottled clay with prismatic structure in right side of profile face.

CTRL-regraded land

As a result of the soil stripping, regrading and soil replacement works undertaken in association with construction of the Channel Tunnel Rail Link, there is some soil variability unrelated to geology or geomorphology and some remaining soil compaction. The raised land taking Henhurst Road over the CTRL has 25 cm of sandy silt loam topsoil over uncompacted mottled fine sandy loam, probably brought-in Thanet Beds material. Further east beside the CTRL the upper 15 cm of subsoil in a zone extending up to 35 m in from the fenceline is very compact and fairly stony.

APPENDIX 1
DETAILS OF OBSERVATIONS

Jeskens Farm, Cobham - Details of observations at each sampling point

| Obs No | Topsoil | | | Upper subsoil | | | Lower subsoil | | | Slope (°) | Wetness Class | ALC grade | Main limitation |
|--------|------------|------------|------------|---------------|---------------------|----------|-----------------|--------------------------------|--------------|-----------|---------------|-----------|-----------------|
| | Depth (cm) | Texture | Stones (%) | Depth (cm) | Texture | Mottling | Depth (cm) | Texture | Mottling | | | | |
| 1 | 0-25 | SZL | 2 | 25-40 | FSL | xx(x) | 40-110 | FSL | xxx | 1 | I | | D |
| 2 | 0-30 | compactSZL | 4 | 30-45 | stony FSL | x | 45-70 70-110 | SZL MZCL | o x | 2 | I | | |
| 3 | 0-30 | SZL | 4 | 30-60 | SZL | x | 60-110 | MCL | xxx | 0 | I-II | 2 | D |
| 4 | 0-28 | SZL | 5 | 28-55 | stony SL/SCL | o | 55+ | stopped by stones | | 3 | I | 2 | D |
| 5 | 0-28 | SZL | 2 | 28-45 | SZL | o | 45-110 | MCL | xx | 2 | I | | |
| 6 | 0-30 | SZL | 5 | 30-45 | MCL | o | 45-55 55+ | stony HCL stopped by stones | xx | 5 | (I) | 2 | |
| 7 | 0-29 | SZL | 7 | 29-45 | stony FSL-SZL | o | 45+ | stopped by stones | | 2 | (I) | 2 | |
| 8 | 0-28 | SZL | 5 | 28-55 | MCL | xx | 55-110 | C | xxx | 1 | II | 2 | W |
| 9 | 0-27 | FSL | 4 | 27-110 | FSL | o | | | | 2 | I | 2 | D |
| 10 | 0-27 | SZL | 5 | 27-40 | MCL | o | 40-70 70-100 | HCL MCL | xx xxx | 3 | I | 2 | |
| 11 | 0-28 | SZL-MCL | 5 | 28-60 | stony MCL | x | 60+ | stopped by stone | | 1 | (I) | 2 | D |
| 12 | 0-28 | MCL | 2 | 28-60 | MCL/HCL | xx | 60-100 | HCL | xxx | 2 | I-II | 2 | W |
| 13 | 0-30 | SZL | 3 | 30-65 | stony (10%) SZL-MCL | o | 65-100 | stony (15%) MCL | xx | 3 | (I) | | |
| 14 | 0-29 | FSL | 4 | 29-45 | SZL | x | 45-70 70-110 | MCL MCL | xx xxx | 2 | I-II | | |
| 15 | 0-30 | SZL | 5 | 30-42 | stony SZL | o | 42+ | stopped by stones | | 1 | (I) | 2 | D |
| 16 | outside | site | | | | | | | | | | | |
| 17 | 0-28 | SZL-MCL | 1 | 28085 | MCL | o | 85-100 | MCL | xx | 1 | I | | |
| 18 | 0-30 | SZL | 2 | 30-70 | stony SZL | o | 70-95 95-110 | MCL M/HCL | o xx | 3 | I | | |
| 19 | 0-28 | SZL | 6 | 28-50 | stony SZL | o | 50+ | stopped by stones | | 2 | (I) | 2 | D |
| 20 | 0-27 | SZL-MCL | 3 | 27-45 | SZL | xx | 45-60 60-100 | C HCL | xxx xxx | 2 | II | 2 | W |
| 21 | | stony MCL | | | impenetrable | | | | | 2 | | | |
| 22 | 0-25 | FSZL | 2 | 25-40 | ZL-ZCL | o | 40-100 | MZCL | x | 0.5 | I | | |
| 23 | 0-26 | SZL | 2 | 26-110 | SZL | o | | | | 5 | I | | |
| 24 | 0-26 | FSL-SZL | 4 | 26-55 | MCL | o | 55-75 75-100 | SZL MCL | xxx xxx | 2 | I-II | | |
| 25 | 0-29 | SZL | 5 | 29-45 | HCL | xx | 45-75 75-100 | compact HC:L MCL | xxx xx(x) | 1 | I | | |
| 26 | 0-29 | SZL | 2 | 29-70 | SZL | o | 70-100 | MCL | x | 1 | I | | |
| 27 | outside | site | | | | | | | | | | | |
| 28 | 0-30 | SZL | 5 | 30-50 | stony SZL | o | 50+ | stopped by stones | | 0.6 | I | | |
| 29 | 0-26 | ZL | 2 | 26-100 | MZCL | (x) | | | | 0 | I | 1 | |
| 30 | 0-24 | MCL | 1 | 24-50 | MCL | x | 50-110 | MCL+FSL | xxx | 4 | I | | |
| 31 | 0-25 | SZL | 1 | 25-70 | SZL-MCL | o | 70-100 | compact HCL | xx(x) | 0.5 | I | | |
| 32 | 0-28 | SZL | 20 | 28-40 | stony MSL | o | 40+ | stopped by stones | | 2 | I | | |
| 33 | 0-30 | SZL-MCLca | 1 | 33-80 | SZLca | o | 80-110 | MCL | x | 2 | I | | |
| 34 | 0-25 | FSL | 1 | 25-80 | MSL | o | 80-100 | MSL/SCL | x | 1 | I | | |
| 35 | 0-30 | SZL/MCL | 8 | 30-40 | stony SZL | x | 40+ | stopped by stones | | 0.5 | (I) | | |
| 36 | 0-29 | ZL | 0 | 29-100 | MZCL | (x) | | | | 0 | I | 1 | |
| 37 | 0-25 | SZL | 1 | 25-55 | SZL | o | 55-75 75-100 | MCL HCL | xx xxx | 1 | II | | |
| 38 | 0-26 | SZL | 2 | 26-42 | SZL | xx | 40-66 | HCL (?sp) | xxx | 5 | II-III | 2 | W |

| Obs No | Topsoil | | | Upper subsoil | | | Lower subsoil | | | Slope (°) | Wetness Class | ALC grade | Main limitation |
|--------|------------|---------|------------|----------------|-------------|----------|-----------------|----------------------------------|--------------|-----------|---------------|-----------|-----------------|
| | Depth (cm) | Texture | Stones (%) | Depth (cm) | Texture | Mottling | Depth (cm) | Texture | Mottling | | | | |
| 39 | 0-26 | SZL | 2 | 26-110 | SZL | o | 55-100 | HCL | xx-xxx | 2 | I | | |
| 40 | 0-26 | SZL | 2 | 26-70 | SZL | o | 70-110 | MZCL | x | 3 | I | | |
| 41 | 0-30 | SZL | 3 | 30-60 | stony MCL | xxx | 60-100 | SCL | xx | 3 | I | | |
| 42 | 0-25 | HCL | 3 | 25-45 | C | xx(x) | 45-75 75-110 | C HCL | xxx xx(x) | 1 | II-III | 3a-b | W |
| 43 | 0-25 | ZL | 3 | 25-75 | ZL | o | 75-100 | ZL | x | 1 | I | 1 | |
| 44 | 0-25 | SZL | 6 | 25-40 | HCL | xx | 40+ | stopped on stones | | 1 | (II) | | |
| 45 | 0-28 | MCL | 4 | 28-55 | HCL | x | 55-75 75-100 | C HCL | xxx xx(x) | 1 | II | | |
| 46 | 0-26 | SZL | 2 | 26-55 | SZL | x | 55-90 80-100 | MCL C | xx(x) xxx | 4 | II | 2 | W |
| 47 | 0-26 | SZL | 2 | 26-55 | FSL-SZL | xx | 55-80 80-110 | FSL LFS | xxx xxx | 2 | I | 2 | D |
| 48 | 0-28 | MCL | 1 | 28-60 | MCL | x | 60-75 75-100 | MCL SCL | xxx xxx | 2 | I-II | 2 | D |
| 49 | 0-30 | FSL | 2 | 30-40 | FSL | o | 40+ | stopped by stones | | 4 | I | 2 | D |
| 50 | 0-28 | M/HCL | 3 | 28-50 | C | xxx | 50-100 | HCL | xxx | 1 | III | 3a-b | W |
| 51 | 0-28 | M/HCL | 2 | 28-50 | HCL/C | xxx | 50-110 | HCL | xxx | 1 | III | 3a-b | W |
| 52 | 0-26 | ZL-SZL | 4 | 26-45 | stony HCL | o | 45-70 70+ | stony HCL chalk | xx | 1 | | | |
| 53 | 0-28 | ZLca | 4 | 28-50 | ZL-SZLca | o | 50-75 75+ | HCLca chalk | xx | 2 | I | | |
| 54 | 0-25 | MCLca | 3 | 25-50 | MCLca | x | 50-75 75+ | HCLca stopped on stones | xxx | 2 | II | 2 | W |
| 55 | 0-28 | SZL | 1 | 28-75 | SZL | o | 75-95 95-100 | SZL SZL | xx xxx | 4 | I | | |
| 56 | 0-24 | SZL | 3 | 24-45 45-65 | MCL MCL | o xx | 65-80 80-110 | HCL MCL | xxx xxx | 2 | I-II | | |
| 57 | 0-30 | SZL | 3 | 30-110 | SZLca | o | | | | 5 | I | | |
| 58 | 0-31 | HCL | 4 | 31-60 | HCL | o | 60-75 75+ | stony C stopped on stones | xxx | 1 | II | 3a | W |
| 59 | 0-30 | SZL | 2 | 30-50 | MCL | o | 50-75 75-100 | HCL C | xx xxx | 1 | I-II | | |
| 60 | 0-32 | MCL | 7 | 32-45 | stony MCLca | o | 45+ | stopped on stones | | 0 | (I) | 2 | D |
| 61 | 0-27 | MCL | 3 | 27-65 | MCL | o | 65-85 85+ | stony MCLca stopped on stones | x | 0.5 | I | 2 | D |
| 62 | 0-26 | SZL | 1 | 26-70 | MCL | o | 70-95 95+ | stony HCL stopped on stones | x | 0.5 | I | 2 | D |
| 63 | 0-28 | SZL-ZL | 2 | 28-50 | SZL-ZL | o | 50-75 75+ | MZCL-MCL stopped on stones | o | 1 | I | 2 | D |
| 64 | 0-26 | HCLca | 3 | 26-60 | HCLca | xx | 60-110 | C | xxx | 4 | II | 2 | W |
| 65 | 0-30 | SZL | 1 | 30-45 | MCL | o | 45-110 | MCL | xx | 1 | I | 1 | |
| 66 | 0-28 | SZL | 2 | 28-65 | MCL | o | 65-100 | HCL | xx | 1 | I | 1-2 | d |
| 67 | 0-28 | SZL | 2 | 28-40 | SZL | o | 40-75 75-110 | HCL MCL | xx xx | 5 | I-II | 2 | D |
| 68 | 0-31 | HCL | 4 | 31-50 | HCL | xx(x) | 50-70 70-90 | HCL MCL | xxx xx | 1 | I-II | 3a | W |
| 69 | 0-29 | SZL/MCL | 1 | 29-70 | HCL | xx | 70-100 | HZCL | xxx | 1 | II | 2 | W |
| 70 | 0-27 | HZCL | 2 | 27-45 | HCL/C | xxx | 45-70 70-110 | gyHZCL gyMZCL | | 0.5 | II-III | 3a-b | W |

| Obs No | Topsoil | | | Upper subsoil | | | Lower subsoil | | | Slope (°) | Wetness Class | ALC grade | Main limitation |
|--------|------------|---------|------------|---------------|---------------|----------|-----------------|--------------------------------|------------|-----------|---------------|-----------|-----------------|
| | Depth (cm) | Texture | Stones (%) | Depth (cm) | Texture | Mottling | Depth (cm) | Texture | Mottling | | | | |
| 71 | 0-26 | MZCL | 3 | 26-110 | HZCL/ZC (?sp) | xx | | | | 1 | I-II | 2 | W |
| 72 | 0-27 | MCL | 2 | 27-50 | MCL | o | 50-90 90-110 | MZCL gnHCL/C | o xxx | 1 | I | 2 | D |
| 73 | 0-28 | SZL | 1 | 28-70 | ZL | o | 70-110 | MZCL | o | 1 | I | 1 | |
| 74 | 0-27 | SZL | 1 | 27-45 | MCL | x | 45-75 75-100 | MCL SZL | xxx xx | 1 | I-II | 1 | |
| 75 | 0-29 | M/HCL | 3 | 29-40 | HCL | x | 40-70 70-100 | C MCL(ca) | xxx xx | 1 | II-II | 3a | W |
| 76 | 0-32 | MCL | 2 | 32-50 | MCL | o | 50-60 60+ | stony HCL stopped on stones | xx(x) | 1 | (II) | 2 | D |
| 77 | 0-29 | SZL | 8 | 29-42 | stony MCL | x | 42+ | stopped on stones | | 1 | (I) | 2 | D |
| 78 | 0-29 | MZCL | 1 | 29-65 | MCL | xx | 65-80 90-110 | C HCL | xxx xxx | 1 | II | 2 | W |
| 79 | 0-29 | MZCL | 1 | 29-110 | MZCL | o | | | | 1 | I | 1 | |
| 80 | 0-30 | MCL | 3 | 30-45 | MCL | o | 45-55 55+ | stony HCL stopped on stones | xx | 1 | I | 2 | D |
| 81 | 0-30 | SZL | 1 | 30-50 | MCL | o | 50+ | stopped on stones | | 1 | I | 2 | D |
| 82 | 0-28 | MZCL | 22 | 28-70 | MCL | xx+xxx | 70-110 | MCL | xxx | 1 | I-II | 2 | D |

Key to soil and ALC tables (a depth underlined (e.g. 50) indicates the top of a slowly permeable layer; ?sp indicates a layer that is borderline to being slowly permeable)

Mottle intensity:

o unmottled
x few to common rusty root mottles (topsoils) or a few ochreous mottles (subsoils)
xx common to many ochreous mottles and/or dull structure faces
xxx common to many greyish or pale mottles (gleyed horizon)
xxxx dominantly grey, often with some ochreous mottles (gleyed horizon)

Texture:

C - clay ZC - silty clay SC - sandy clay
SCL - sandy clay loam CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SZL - sandy silt loam (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse)
LS - loamy sand (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
ca - calcareous
gn - green colouration
gy - grey colouration

Limitations:

W - wetness/workability
D - droughtiness
De - depth
St - stoniness
Sl - slope
F - flooding

APPENDIX 2
NUTRIENT ANALYSES OF TOPSOILS

| Sampling unit* (Map 4) | pH | Total N (%) | Avail P index (mg/l) | Avail K index (mg/l) | Avail Mg index (mg/l) | Total S (mg/kg) | Electrical Conductivity (µS/cm) |
|----------------------------------|-----------|--------------------|-----------------------------|-----------------------------|------------------------------|------------------------|--|
| A1 | 7.0 | 0.12 | 3 (40.4) | 2 (129) | 1 (44) | 320 | 1970 |
| A2 | 6.5 | 0.15 | 3 (38.0) | 2 (208) | 2 (75) | 430 | 1947 |
| B | 7.1 | 0.14 | 3 (26.4) | 3 (299) | 2 (59) | 370 | 2053 |
| C | 6.1 | 0.14 | 3 (36.2) | 2 (189) | 1 (44) | 370 | 1989 |
| D1 | 6.2 | 0.16 | 3 (32.4) | 3 (352) | 2 (51) | 420 | 2120 |
| D2 | 5.8 | 0.13 | 2 (19.4) | 2 (213) | 2 (50) | 450 | 2000 |
| E | 7.2 | 0.13 | 3 (30.0) | 2 (174) | 1 (38) | 460 | 2021 |
| F | 7.3 | 0.19 | 1 (13.2) | 2 (185) | 1 (40) | 540 | 2010 |
| G | 6.9 | 0.15 | 2 (25.4) | 2 (197) | 1 (36) | 390 | 2010 |
| H | 6.5 | 0.11 | 3 (32.0) | 2 (140) | 1 (35) | 360 | 1948 |
| J1 | 7.2 | 0.15 | 3 (31.4) | 3 (251) | 1 (32) | 390 | 2042 |
| J2 | 6.0 | 0.14 | 3 (30.2) | 2 (141) | 0 (24) | 480 | 1958 |
| J3 | 6.2 | 0.13 | 1 (12.2) | 2 (123) | 1 (40) | 180 | 1959 |
| K | 6.7 | 0.14 | 2 (22.2) | 2 (185) | 1 (42) | 130 | 2106 |

* all analyses are based on a single bulked sample made up from about 20 small samples taken from across the unit.