PHYSICAL CHARACTERISTICS REPORT FOR LAND AT MIDDLETON HALL

An Agricultural Land Classification of approximately 4.4 hectares of land, to the south of the existing quarry at Middleton Hall was carried out on the 26 November 1989.

The survey was undertaken using a 5cm dutch auger. The soils were augered at 100 metre grid intersections to a depth of at least 100cm or to an impenetrable layer if closer to the surface. Additional profiles were augered as necessary to give a density of one boring per 0.55 hectares.

The land is mapped as Sub grade 3b with a smaller area of Sub grade 3a. Two soil units have been identified.

1. Land use

The site supports permanent pasture on which horses were grazing at the time of survey.

2. Site details and limitations

2.1 Climatic limitation: The site receives an average annual rainfall of approximately 669mm and has an accumulated temperature (January to June) of 1432°. This combination of rainfall and accumulated temperature does not limit the agricultural use of the land.

2.2 Location and site limitation: The site lies to the east of the A4091, south of and adjacent to the existing extraction area at Middleton Hall quarry, between Middleton Pool and Newhouse Farm. The land lies at an altitude of about 70cms and the land is generally level with slight undulations. Nowhere does the gradient or irregularity limit the classification of the land.

2.3 Flood limitation: From the limited amount of information available, it would appear that flooding of the site is not

a serious problem. If further information becomes available it may be necessary to reconsider the grading of the land.

2.4 Geology and soil limitations: The area is underlain by River Terrace and Boulder Clay deposits on which variable soils have developed. On the lowest lying land clay loams and sandy clay loams overlie clay loam and clay with gravel in a variable matrix below 60cm. These soils are prone to seasonal waterlogging and fall into Wetness Class IV.

On the slightly higher ground in the centre and south of the site slightly stony, sandy clay loams and occasional sandy loams overlie sandy clay loam or clay loam with a gravelly clay loam to sand matrix below 65cm. These soils fall into Wetness Class III.

2.5 Interactive limitations: Soil wetness is the main limiting factor in the classification of the land. Most of the soils have slowly permeable layers at 25 or 45cm and show evidence of seasonal waterlogging at depths below 20 or 45cm. In this locality soils are at field capacity for about 150 days so the higher quality soils fall into Wetness Class III whilst the lower quality soils lie in Wetness Class IV. By relating wetness class to soil texture and medium field capacity days the land quality can be assessed. A wetness limitation has prevented this land being graded higher than Sub grade 3a and 3b. The grading of these soils is not limited by drought or erosion.

3. Agricultural Land Classification

The land has been graded under the assumption that an effective underdrainage system could be installed to control the water table. If drains could not be installed effectively the land may warrant further downgrading.

3.1 Sub grade 3a. This grade accounts for approximately 1.3 ha

and 29% of the site. Typically sandy clay loam soils overlie sandy clay loam and clay loam with gravelly clay loam and clay at depths below 60cm. The soils fall into Wetness Class III having a mottled, slowly permeable layer at depths between 40 and 50cm. The soils are at field capacity for about 150 days, and are therefore limited to Sub grade 3a because of seasonal wetness and workability problems.

3.2 Sub grade 3b. This grade accounts for 3.1 ha and 71% of the site. It is mapped to include clay loam and sandy clay loam soils which overlie mottled, clay loam or clay. The soils fall into Wetness Class IV and hence into Sub grade 3b. Despite the dry summer the soils were wet below 55cm.

4. Soil Resources

Two soil units have been identified which will require separate handling if the site is worked. Discrete areas have been identified on the map where one unit predominates. In reality the two units are intermixed and every effort should be made to separate out the difference soils if the site is worked for sand and gravel.

4.1 Unit 1. Soils in this unit are medium to heavy textured and are seasonally waterlogged. Below the root mat, 20cm of dark grey (10YR 4/1) sandy clay loam or clay loam overlies greyish brown (10YR 5/2) heavy clay loam or clay, to about 60cm . Below this depth gravel occurs in a clay loam to sand matrix. The soils have many prominent ochreous and brown mottles to the surface and grey ped faces below 20cm.

The soil structure has weakly formed, very coarse prismatic peds which break to moderately formed coarse subangular blocky peds when disturbed. The soils are slightly porous to 28cm, but contain less than 0.5% macropores below this depth. The soils are slowly permeable below 28cm.

Occasional rounded quartzite size pebbles occur throughout the profile to 60cm but below this depth soils contain approximately 25% of small, medium and occasionally large rounded quartzite pebbles. Plant roots are common to 55cm but mainly confined to ped faces below 30cm. The pH ranges from 5.5 near the surface to 6.6 at 35-45cm, and organic matter forms 2.9% of the topsoil.

4.2 Unit 2. This unit is mapped in the north east and south east of the site.

Typically 25cm of dark brown (10YR 3/3) sandy clay loam overlies a similar but less organic subsoil to 42cm. Below 42cm dark greyish brown (10YR 4/2) mottled, sandy clay loam to clay loam occurs, whilst below 65cm gravel occurs in a clay loam and loamy sand matrix. The soils have many prominent ochreous mottles and iron concretions below 42cm.

In the vicinity of the pit the soils have moderately porous, moderately formed, fine and medium subangular blocky structures to 42cm and moderately to strongly formed coarse subangular blocky peds below this depth. The subsoil below 45cm contains less than 0.5% macropores and a slowly permeable layer occurs at this depth.

The soils contain less than 10% of small and medium rounded quartzite pebbles to 65cm, but contain approximately 30% below this depth. Plant roots are abundant at the surface and common to 65cm. Only occasional roots were seen below 65cm.

The organic matter ranges from 4.7% in the topsoil to 1.5% at a depth of 55cm and the pH varies from 4.9% in the topsoil to 6.3% in the subsoil.

5. Summary

The land is mapped as Sub grade 3a and 3b and two soil units have been identified.

Summary of Land Classification

Grade	%	Area (ha)
3a	29	1.29
3b	71	3.14
Total	100	4.43

Summary of Soil Units

Unit	Depth	Texture	Stones	Organic matter	pH
1	0-20cm	SCL/ CL	< 5%	2.9%	5.5
	20-60	CL/C	< 5%	1.3%	6.6
	60-100	CL+S	30%	-	-
2	0-25cm	SCL/SL	<10%	4.7%	4.9
	25-65cm	CL/SCL	<10%	1.5%	6.3
	65-100cm	LS+CL	30%	-	-

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