Hermitage Quarry, Maidstone, Kent

Assessment of Restored Land
Report of Survey
April 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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ASSESSMENT OF RESTORED LAND
REPORT OF SURVEY

Introduction

1 This report presents the findings of a soil survey carried out on approximately 6 hectares of restored agricultural land at Hermitage Quarry near Maidstone in Kent The survey was carried out on 2nd April 1996

2 The survey was commissioned by the Ministry of Agriculture Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading The purpose of the survey was to investigate the physical characteristics of the restored land The pre-working characteristics of the land have been documented through a survey carried out during 1988 (ADAS Ref 2013/19/88)

3 The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS Also present at the time of survey were Neville Sherlock of Statutory ADAS Ben Linscott of MAFF and Tom La Dell the mineral operators consultant

Background

4 In 1988 prior to soil stripping and the extraction of the underlying ragstone the land in question was the subject of a survey for the purpose of carrying out an Agricultural Land Classification (ALC) and statement of physical characteristics (ADAS Ref 2013/19/88)

5 A total of four soil auger borings were described across the site and the land was classified as Grades 3b and 3c in accordance with the ALC guidelines which were in place at the time (MAFF 1976) Soil profiles were described as comprising either fine sandy loam or fine sandy clay loam topsoils overlying similar upper subsoils and continuing to at least 1 metre or passing to heavier lower subsoils of sandy clay All of the soils exhibited evidence of impeded drainage in the form of distinct mottling from below the topsoil and the land was therefore assigned to Grades 3b and 3c on the basis of poor drainage status

6 Following mineral extraction 6 hectares of the site has been reinstated to agriculture The purpose of carrying out a soil survey on this land was to investigate the nature of the material now present on the site and describe its physical characteristics It was never the intention to assign an ALC grade to the land Physical conditions on reinstated or restored land particularly in the early years after soil replacement are likely to be unstable To reduce problems arising from the assessment of unstable physical conditions land should not where possible be graded until completion of the 5 year aftercare programme The land at Hermitage Quarry has only been in aftercare for approximately 18 months

Results of Survey

7 The survey work was conducted at an average density of approximately one boring per hectare A total of 6 soil auger borings and two soil inspection pits were described across the restored land The location of these is shown on the attached sample point map

8 At the time of survey the land had been sown to grassland In general the crop growth was poor and extremely patchy across the site There was evidence of slight surface settlement in places and the presence of foreign material such as brick fragments and pieces of scrap metal was noted

9 It was immediately apparent upon investigation that there is an absence of true topsoil on the site The term topsoil is used to refer to material which originally developed at the top of the soil profile It is characterised by darker colours higher organic matter levels and greater biological activity than subsoil developed from the same parent material On this site the top 25 cm of the restored profile was found to comprise almost entirely (i e between 80 and 90%) of subsoil material A shortage or absence of topsoil can significantly reduce the moisture holding and nutrient retention capacity of the land This will result in an increased risk of structural damage and will adversely affect soil drainage and workability

10 The top 25 cm of the restored profile was found to comprise textures of sandy clay loam heavy clay loam or clay typically containing between 5 and 25% total ragstone fragments Soil inspection pits showed the top 25 cm to be compacted and poorly structured In soil pit 1 the top 10 cm was found to comprise very coarse platy peds overlying a further 25 cm in which there were no structural units evident i e massive structure Both horizons were described as being of very firm soil strength Roots did not appear to be penetrating much below the top 10 cm indicative of the compacted nature of the material In soil pit 2 the top 25 cm was described as comprising very coarse platy peds of very firm strength Roots were observed to a depth of 25 cm beyond which the soil had a massive structure and was severely compacted

11 Disturbed profiles exhibiting severe topsoil compaction are likely to suffer from increased wetness problems and have smaller available water values than non compacted topsoils Such topsoils are often waterlogged for long periods of the year and when they do dry out they generally become very hard making them difficult to cultivate satisfactorily Thus in both wet and dry conditions these topsoils represent an unfavourable medium for the development of plant roots

12 Subsoils (i e the restored profile between 25 and 120 cm) were found to be extremely variable across the site Soil textures were described as mainly heavy clay loams along with sandy clay loams with heavier (clay or sandy clay) or lighter (sandy loam loamy sand or sand) inclusions Soil textures and colours were very mixed within profiles and also spatially Subsoils were found to contain 10 15% ragstone fragments There was evidence of mottling in most of the observations but these do not necessarily reflect current drainage conditions they may be relics of the undisturbed soil drainage status There was evidence of slight anaerobism (bluish grey colouration accompanied by a foul smell) in some of the profiles

13 The soil inspection pits proved the subsoils to be poorly stuctured and compacted There was little evidence of the existence of structural units such that all horizons were described as massive and of very firm soil strength Soil porosity was very low (i e less than 0 5% biopores > 0 5 mm in diameter) and negligible in places Plant roots were virtually absent except for a few which are likely to be relics of the pre worked soils

14 Severe subsoil compaction as observed across this site will adversely affect soil drainage causing soils to be waterlogged as well as reducing the amount of soil moisture which is available In agricultural terms such characteristics will influence crop growth and development and restrict the opportunities for cultivations and/or grazing

Summary

15 The site survey has described the physical characteristics of the soils which have been reinstated and returned to agricultural use across approximately 6 hectares of land at Hermitage Quarry Field inspection of the restored land has shown that there are two main problems associated with it in terms of its use for agriculture Firstly there appears to be an absence of topsoil resource across the entire site Secondly the restored profiles are severely compacted and poorly structured throughout Such land is likely to be severely limited in its use for agriculture realistically being restricted to seasonal grazing