CONINGTON LANDFILL SITE, CAMBRIDGESHIRE
BASELINE SOIL SURVEY

1. INTRODUCTION

The site of approximately 11 ha in extent lies between the villages of Conington and Fenstanton in Cambridgeshire (Grid Ref. TL 327675) and was used for the extraction of sand and gravel during the widening of the A604 (now the A14). Following mineral extraction the site was used by Cambridgeshire County Council for waste disposal by landfilling. The site is unlined and does not have an engineered cap. The site is divided into two areas with Area A being in the east and north east of the site and has little vegetation cover. Area B in the west and south of the site has an established ryegrass cover. The whole site is to be restored to agricultural usage.

This survey was undertaken to establish the nature of the soils presently on site and identify potential limiting factors for the restoration of the site to productive agriculture.

2. METHODS

The site was surveyed on an approximate 100 m grid interval with additional sample locations at a number of points using a hand held dutch auger and a spade. Sampling was to impenetrable material which was usually between 40 cm to 80 cm with a maximum sample depth of 1 m wherever possible. At each sample location soil texture, stoniness and any factors likely to limit agricultural usage of the site were assessed.

3. SURVEY RESULTS

Area A

Area A had not been seeded and vegetation in the north and north east of this area was restricted to weed species which gave a ground cover of approximately 30%. The south west of Area A was unvegetated and may have been subject to more recent soil movements than the remainder of Area A.

Generally Area A consisted of very mixed subsoil materials usually of clay or heavy clay loam textures with no topsoil being evident. Occasionally lighter medium clay loam or medium sandy clay loam textures were encountered within the restored profile. The reinstated soils were usually very hard and compacted from approximately 20 cm becoming impenetrable between 40-80 cm. Typically the reinstated soil layer was approximately 60 cm thick but fill material was encountered at a single sample location at 40 cm. The surface of much of the area is uneven with large stones, concrete and rubble evident on the surface ranging in size from small to a few very large blocks of concrete up to 50 cm in diameter. The stone content varied from only 5% to over 35% within the area.

The soil immediately above the impenetrable horizon was usually wet or saturated indicating the slowly permeable/impermeable nature of the compacted horizon.

A small L-shaped soil bund consisting of medium sandy clay loam/medium clay loam topsoil material was alongside the southern and south eastern boundaries of Area A.

Gradients were generally gentle to moderately sloping being between 1° and 4° which are not restrictive to agricultural usage of the area.

Area B

Area B has been sown to a grass cover but the sward showed patches of yellowing and uneven growth indicating a possible problem with the migration of landfill gas from within the putrescible waste.

In this area the topsoil consisted of a medium sandy clay loam or occasionally medium clay loam textured material which was approximately 30 cm thick but ranged from 20 cm to 40 cm. Stone content was generally less than 10% with stones usually small to medium in size with only a small number of large stones evident. Occasional sample points showed evidence of anaerobic conditions brought about by the presence of landfill gas within the topsoil.

An upper and a lower subsoil horizon were usually present across this area. These horizons consisted of a medium clay loam/medium sandy clay loam textured upper subsoil (approximately 25 cm thick) overlying a heavy clay loam/clay textured lower subsoil (approximately 20 cm thick). Compaction was evident in both subsoil horizons but was found to a greater extent in the lower subsoil horizon. At a number of sample locations the upper subsoil was saturated as water flow through the lower subsoil was restricted. The lower slopes and the base of slopes were found to be very wet with standing water at some locations.

Evidence of anaerobic conditions in the subsoil was found at several sample locations indicating the presence of landfill gas within the soil profile.

Stone content of the upper and lower subsoil horizons varied between 5% and 40% with typical stone contents being 15% and 20% for the upper and lower horizons respectively. Stones were normally small to medium in size but a few large stones were found within the subsoil profile.

Roots were generally confined to the upper 30 cm of the soil profile with little rooting into the subsoil.

Landfill material was encountered at two sample locations at 50 cm and 70 cm, this material being black and anaerobic in nature.

Gradients within Area B were measured at between 1° and 5° which are gently to moderately sloping which does not restrict the agricultural usage of site.

4. CONCLUSIONS

A number of factors may be identified from this survey which will limit the agricultural usage of the restored areas.

In Area A the lack of a topsoil cover is of primary concern as no useful agricultural use of this area may be made while such a cover is lacking.

The size and content of the stones within the subsoil already placed on Area A are also of concern. These stones will reduce the moisture available for plant growth and are likely to cause excessive wear and tear on agricultural machinery used in the farming of this area. As many of the large stones as possible should therefore be removed from the agricultural area prior to any laying of topsoil, otherwise during subsequent cultivations the large stones may again be brought to the surface.

In areas A and B the imperfect drainage caused by compaction within the restored profiles will be highly detrimental to the agricultural usage of the area. Such conditions are likely to limit times of access to the site for cultivation, general husbandry practices and grazing and prevent root penetration thus limiting the volume of soil from which moisture may be exploited. Additionally the very wet areas created by the drainage problems will have serious adverse effects on plant growth and establishment. Relief of the compaction by subsoiling techniques may alleviate the problem but may not be wholly successful in the absence of an underdrainage system. Subsoiling may also bring to the surface stones from within the subsoil horizons which would require removal from the agricultural areas.

Landfill gas is also likely to be a problem for the agricultural usage of the site as damage to the existing grass sward in Area B is already evident. A gas venting system may therefore be required to alleviate the problem of gas migration for the restored areas to be used to productive agriculture.

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