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Report + Draft maps

to TIM ELLIOTT

Stony Heap, Leadgate, Durham

Proposed Opencast Coal Site

ADAS

Leeds Regional Office

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1. AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED OPENCAST COAL SITE AT STONY HEAP, LEADGATE, DURHAM

1.1 Introduction

The site (NGR NZ 147517) is located about 2 km east of Leadgate in County Durham. It covers a total area of 98.3 hectares 95% of which is currently in agricultural use. Survey work was carried out in January 1990 when soils were examined by hand auger borings at 97 points predetermined by the National Grid. In addition three soil pits were dug to collect data on soil morphology and to provide samples for laboratory analysis.

1.2 Climate and Relief

Salient climatic parameters at Stony Heap are as follows:-

Average Annual Rainfall (mm)	795
Accumulated Temperature (above 0°C) Jan-June	1107
Field Capacity Days	200
Moisture Deficit, wheat (mm)	68
potatoes (mm)	47

These factors impose an overall climatic limitation of subgrade 3b across the whole site. Altitude ranges from 265 m a.o.d. in the north along the A693 road, to 193 m a.o.d. south of the disused colliery at Stony Heap.

The site has a southerly aspect and most of the land is moderately sloping. Steep slopes are restricted mainly to the escarpment north of Coronation House.

1.3 Geology, Soils and Drainage

A medium to heavy textured drift deposit covers most of the site. Soil textures reflect the nature of the parent material and topsoils are usually of medium or heavy clay loam or silty clay loam over a clayey slowly permeable subsoil (Wetness Class IV). Along the escarpment north

of Coronation House drift is thin or absent and soils have developed directly on Carboniferous Coal Measure Sandstones. Soils here are freely drained, shallow and light in texture (Wetness Class I). At various locations across Stony Heap soils have been disturbed by small scale opencast or bell pit type coal workings. This has resulted in some top and subsoils being mixed as well as a certain amount of compaction.

1.4 Land Use

Improved or semi improved grassland occurs west of Stony Heap Lane. To the east is mostly rough grazing.

1.5 Agricultural Land Classification

1.5.1 Subgrade 3b (36.3 hectares/37% of total area)

This subgrade is common in the northern and western parts of the site. Topsoils are medium textured clay loams or silty clay loams over clayey slowly permeable subsoils (Wetness Class IV). Some profiles are slightly disturbed. Topsoil wetness and workability as well as the overall climatic limitation restrict this land to a maximum of subgrade 3b.

1.5.2 Grade 4 (48.7 hectares/49% of total area)

Grade 4 land is widespread in the south and east and generally contains heavier textured soils than the 3b areas. Topsoils consist of heavy clay loam or clay over similarly textured slowly permeable subsoils (Wetness Class IV). Severe soil wetness and workability limitation restricts this land to grade 4. Also included within this grade are areas of strongly sloping land (11-18° gradients) where gradient is the overriding limitation.

1.5.3 Grade 5 (8.7 hectares/9% of total area)

Very wet hollows, slopes of over 18° and extremely disturbed land are all placed within Grade 5.

1.5.4 Non Agricultural (0.8 hectares/1% of total area)

This consists of derelict land north of the disused Stony Heap Colliery.

1.5.5 Urban (3.8 hectares/4% of total area)

The dismantled railway and a concrete access road are included within the urban category.

STATEMENT OF PHYSICAL CHARACTERISTICS
(SOIL PROPERTIES AND RESOURCES)

Three major soil types occur at Stony Heap. Typical profile descriptions of each soil are given in the tables at the end of this report. Topsoil and subsoil resources for the site are shown on the accompanying maps along with soil depth and quantity information.

1. Heavy Textured Drift Derived Soil

This consists of a faintly mottled heavy clay loam or clay topsoil over a similar textured distinctly mottled subsoil. Examination of a typical profile in an inspection pit showed topsoils to have a weakly developed medium angular blocky structure over a coarse prismatic subsoil. Common fine fibrous roots are found in the topsoil passing to a few fine fibrous in the subsoil. This soil type often has a thin fibrous peaty root mat above the topsoil.

2. Medium over Heavy Textured Drift Derived Soil

Here the topsoil is usually an unmottled medium clay loam over a similar or heavier textured distinctly mottled upper subsoil. Topsoils have a medium subangular blocky structure with many fine fibrous roots. The lower subsoil is a yellowish brown clay and has a few fine fibrous roots. Slight stoniness is common throughout the profile. This soil type has been disturbed in several places.

3. Light Textured Soil over Sandstone

This soil is found over weathering sandstone deposits where drift cover is thin or absent. Topsoils are an unmottled, moderately stony medium sandy loam with a fine and medium granular structure. The subsoil is again unmottled with many stones, a fine subangular blocky structure and is usually of medium sandy loam. Below about 55 cm it passes onto weathering sandstone.

Soil Resources

Topsoils

Unit T1 consists mainly of the medium textured drift derived soil occurring in the north and north western parts of the site. It has a mean thickness of 25 cm. Units T2 and T3 are both heavy textured drift derived soils with mean thicknesses of 25 cm and 20 cm respectively. Unit T4 (20 cm thickness) is a small but distinct, light textured topsoil occurring along the escarpment north of Coronation House.

Subsoils

Four subsoil units were identified at Stony Heap. Unit S1 is a heavy textured drift derived unit occurring mainly to the west of Stony Heap Lane. Units S2 and S3 are similar in texture to S1 but have a thinner topsoil above. These units all extend to a depth of at least 100 cm. Unit S4 is a thin light textured subsoil which passes into sandstone at variable depth, but usually within 50 cm from the surface.

STONY HEAP - SOIL PROFILE DESCRIPTIONS

PROFILE PIT 1: HEAVY TEXTURED DRIFT SOIL

Land Use	Rough Grazing
Slope & Aspect	2°SE
Weather	Recently very wet

Horizon Depth (cm)	
0-10	Very dark grey (7.5YR 3/0) fibrous peat; unmottled; stoneless; massive; many fine fibrous roots.
10-30	Greyish brown (2.5Y 5/2) stoneless; heavy silty clay loam; common distinct reddish yellow (7.5YR 6/8) mottles; moist; weakly developed medium angular blocky structure; few fine pores and fissures; moderately firm soil strength; common fine fibrous roots; clear smooth boundary.
30-100	Grey (N6) stoneless; silty clay; many prominent reddish yellow mottles (7.5YR 6/8); wet (standing water at 70 cm); well developed coarse prismatic structure; moderately firm soil strength; few fine fibrous roots.

PROFILE PIT 2: LIGHT TEXTURED SOIL OVER SANDSTONE

Land Use	Rough Grazing
Slope & Aspect	4°W
Weather	Recently very wet

Horizon Depth (cm)	
0-25	Black (10YR 2/1) organic root mat (0-5 cm) over very dark brown (10YR 2/2) medium sandy loam; unmottled; moderately stony with common small and medium and a few large angular sandstones; root mat moist; remainder of horizon only slightly moist; weakly developed fine and medium granular structure; moderate packing density; very porous; very weak soil strength; slightly sticky and moderately plastic; abundant very fine fibrous roots and abundant medium woody in root mat; non calcareous; abrupt wavy boundary.
22-55	Yellowish brown (mined 10YR 5/4 and 10YR 5/6) medium sandy loam; very stony with many small medium and large angular sandstones; moist; weakly developed medium and fine subangular blocky structure breaking to granular moderate packing density; very porous; weak soil strength; slightly sticky and moderately plastic; many very fine fibrous roots; non calcareous; sharp irregular boundary.
55+	Sandstone rubble with matrix of yellowish brown (10YR 5/6) sandy loam.

PROFILE PIT 3: MEDIUM OVER HEAVY TEXTURED DRIFT SOIL

Slope: 3° South
Land Use: Permanent Grass
Weather: Recently very wet

Horizon	Depth (cm)	Description
1	0-24	Very dark greyish brown (10YR 3/2) organic medium clay loam with dark grey (10YR 4/1) structure faces; few fine faint clear yellowish brown (10YR 5/4) mottles; very slightly stony; few medium and large medium angular sandstones; wet; moderately developed coarse to medium subangular blocky structure; medium packing density; moderately porous; few fine macropores and fissures; moderately sticky; moderately plastic; many fine and very fine fibrous roots; non calcareous; sharp wavy boundary.
2	24-65	Yellowish brown (10YR 5/4) clay with grey (10YR 5/1) structure faces; common distinct fine; sharp; strong brown 910YR 5/6) mottles; slightly stony; common large medium angular sandstones; wet near upper horizon boundary slightly moist below; weakly developed adherent very coarse angular blocky structure tending to platy at upper horizon boundary; high packing density; very slightly porous; few fine fissures; very firm soil strength; very sticky; very plastic; few fine fibrous roots above 40 cm; non calcareous; smooth clear boundary.
3	65+	Very dark grey (N3) shaly overburden.

SCHEDULE OF SOIL AUGER BORINGS

TEXTURE

CS	Coarse sand
FS	Fine sand
MS	Medium sand
LCS	Loamy coarse sand
LFS	Loamy fine sand
LMS	Loamy medium sand
CSL	Coarse sandy loam
FSL	Fine sandy loam
MSL	Medium sandy loam
FSZL	Fine sandy silt loam
CSZL	Coarse sandy silt loam
MSZL	Medium sandy silt loam
MZ	Marine light silts
MZCL	Medium silty clay loam
CZCL	Coarse silty clay loam
FZCL	Fine silty clay loam
SCL	Sandy clay loam
MCL	Medium clay loam
ZL	Silty loam
HCL	Heavy clay loam
HZCL	Heavy silty clay loam
C	Clay
SC	Sandy clay
ZC	Silty clay
O	Prefix 'O' for organic
FP	Fibrous peat
HP	Humose peat
LP	Loamy peat
PL	Peaty loam
PS	Peaty sand
SP	Sandy peat
X	Rock

MOTTLES

O	Ochreous
G	Grey