STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION PROPOSED NORMANTON BYPASS, COAL EXTRACTION AND ADVANCED EARTHWORKS WEST YORKSHIRE DECEMBER 1992

ADAS

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SUMMARY

A statement of physical characteristics and Agricultural Land Classification survey of approximately 79ha of land affected by the proposed Normanton bypass and adjoining coal extraction site was carried out in November 1992. This field survey supersedes the desk study of the same area undertaken in September 1992.

62ha of this area, including 28ha of restored open cast coal workings, was in agricultural use. 4ha of this falls within Grade 2, 16ha within Subgrade 3a and 42ha within Subgrade 3b. Also included within the southern part of the site is an area from which coal is being extracted at present.

Soils on the better quality Grade 2 and Subgrade 3a land are formed on medium clay loam or medium sandy loam topsoils overlying similar upper subsoils which pass into the clay or sandstone at depth. Profiles of this type are limited to these grades by either slight droughtiness where light textured, or wetness where clay occurs at depth. Subgrade 3b land is widespread on the heavy compacted restored land in the eastern half of the site. Elsewhere it occurs on poorly drained heavy clay soils or locally on shallow droughty light textured soils overlying sandstone.

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STATEMENT OF PHYSICAL CHARACTERISTICS AND AGRICULTURAL LAND CLASSIFICATION REPORT ON THE PROPOSED NORMANTON BYPASS, COAL EXTRACTION AND ADVANCED EARTHWORKS

1. INTRODUCTION AND STATEMENT OF PHYSICAL CHARACTERISTICS

1.1 Location and Survey Methods

The site lies approximately 1½ Km south of Normanton around National Grid Reference SE 385209. Survey work was carried out in November 1992 when soils were examined by hand auger borings at 100m intervals at points pre-determined by the National Grid. Three soil pits were also dug to allow the assessment of subsoil structure. Land quality was assessed using the methods described in "Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land" (MAFF 1988).

1.2 Land Use and Relief

At the time of survey 79% of the site was in mixed arable and grassland use. The remainder consists of the present coal extraction site, haul roads, woodland and a sports ground.

The area is gently to moderately undulating. Altitude ranges from 38m on the flat ground near the sports field in the north east to 70m on the more undulating land further south.

1.3 Climate

Grid Reference	:	SE 385209
Altitude (m)	:	70
Accumulated Temperature above 0°C (January-June)	:	1342 day°C
Average Annual Rainfall (mm)	:	643
Climatic Grade	:	1
Field Capacity Days	:	141
Moisture Deficit (mm) Wheat	:	100
Moisture Deficit (mm) Potatoes	:	90

1.4 Geology, Soils and Drainage

The site is underlain by Coal Measures. There are no drift deposits and soils are formed, in undisturbed areas, on weathering Coal Measure Shales or weathered sandstone. Profiles on the shales consist mainly of medium or heavy clay loam topsoils over gleyed poorly drained (Wetness Class IV) slowly permeable heavy clay loam or clay subsoils. These are similar to the Dale series mapped by the Soil Survey and Land Resource Centre.

Soils formed over standstone are common in the north east and near Woodhouse Common. In both areas topsoils consist of medium clay loam or stony sandy loam and overlie similar subsoils of variable thickness. Weathering sandstone bedrock occurs between 50 and 100cm depth. These soils which resemble the Soil Survey's Rivington Series, are well drained and fall within Wetness Class I.

The large area of restored land in the south east contains poorly drained (wetness Class IV) heavy textured soils, often with severely compacted subsoil horizons. Overburden occurs at a depth of about 50cm.

1.5 Soil Properties

Three main soil types occur on this site, descriptions of which are given below. Topsoil and subsoil resources are also shown on the accompanying maps along with soil thickness and volume information.

(a) Soil Type 1:- Heavy restored soils (Unit T1/S1)
(Full Profile Description, Table 1)

This soil formed on restored coal workings occurs in the south eastern part of the site. It is characterised by wet medium or heavy textured topsoils (medium or heavy clay loam) over poorly structured compacted very slowly permeable heavy clay loam or clay subsoils. These pass into grey overburden at a depth of about 50cm.

(b) Soil Type 2:- Medium or light textured soils over sandstone (Unit T2/S2)
(Full Profile Description, Table 2)

This soil formed on weathered sandstone occurs in the north eastern and western parts of the site. It is characterised by medium clay loam or medium sandy loam sometimes stony topsoils over similar well drained to imperfectly drained subsoils. Fragmented weathering sandstone occurs at variable depths, usually between 50-100cm from the surface.

(c) Soil Type 3:- Heavy textured clay soils (Unit T3/S3)
(Full Profile Description, Table 3)

This soil formed on Coal Measure clays occurs in the northern and western parts of the site. It is characterised by medium or heavy clay loam topsoils over similar upper subsoils. Lower subsoils of clay or silty clay occur at varying depths. Profiles with clay close to the surface are poorly drained. Those with deeper permeable upper subsoils are imperfectly drained and generally form higher quality land.

1.6 Soil Resources

(i) Topsoils

Unit T1 occurs on restored land in the south eastern part of the site. It is medium or heavy textured consisting of medium or heavy clay loam. It is slightly stony and has a moderately developed coarse subangular blocky or angular blocky structure. Median unit thickness is 30cm.

Unit T2 occurs in the north eastern and western parts of the site where sandstone is close to the surface. It is medium or light textured consisting of medium clay loam or medium sandy loam. It varies from stoneless to moderately stony and has a moderately developed medium subangular blocky structure. Median unit thickness is 30cm.

Unit T3 occurs in the northern and western parts of the site where soils are formed on Coal Measure Clays. It is medium or heavy textured consisting of medium or heavy clay loam and is usually stoneless or only very slightly stony. Structure is weakly or moderately developed coarse subangular or angular blocky. Median unit thickness is 30cm.

(ii) Subsoils

Unit S1 occurs on the restored land in the south east. It is heavy textured consisting usually of clay or silty clay. It is slightly stony and has a massive compacted or weakly developed coarse platy structure. Mean thickness is 20cm.

Unit S2 occurs in the north eastern and western parts of the site. It is light or medium textured (medium sandy loam, sandy clay loam or medium clay loam), and slightly to moderately stony depending on depth to the underlying sandstone. Structure is weakly developed subangular blocky in light textures and moderately developed subangular blocky in medium textures. Mean thickness is 60cm.

Unit S3 occurs in the northern and western parts of the site and consists of clay or silty clay formed from weathering Coal Measure Shales. It is stoneless and has a moderately developed coarse prismatic structure. Mean thickness is 70cm.

2. SOIL PROFILE DESCRIPTIONS

Table 1 Heavy textured restored soil, T1/S1

Profile Pit 1 (Near auger boring 38)

Slope:- 0°
Land Use:- Permanent Pasture
Weather:- Dry after wet period

Depth cm	Horizon	Description
0-25		Very dark greyish brown (2.5Y3/2) medium clay loam containing a few fragments of brownish yellow (10YR6/6) subsoil material; very slightly stony with a few small angular sandstones; wet; moderately developed coarse subangular blocky structure; medium packing density; slightly porous, common fine pores and fissures; firm; moderately sticky and moderately plastic; many very fine fibrous roots; non calcareous; abrupt smooth boundary.
25-50		Brown (10YR5/3) silty clay with common distinct medium strong brown (7.5YR5/8) and grey (5Y6/1) mottles; very slightly stony with a few small angular sandstones; moist; massive to weakly developed coarse platy structure; high packing density ; compacted, very slightly porous; no visible pores; extremely firm; moderately sticky and moderately plastic; few very fine fibrous roots, mainly on crack faces; non calcareous; abrupt smooth boundary.
50+		Grey (5Y5/1) overburden consisting of silty clay containing numerous small grey shale fragments. Compacted, structureless.

Table 2 Medium or light textured soil over sandstone, T2/S2

Profile Pit 2 (near Auger Boring 9)
Slope:- 1°S
Land use:- Arable
Weather:- Dry after wet period.

Depth cm	Horizon Description
0-30	Very dark greyish brown (10YR3/2) medium sandy loam; no mottles; stoneless; moderately developed - medium angular blocky structure; firm soil strength: moderately porous; common fine and medium fibrous roots; slightly sticky; slightly plastic; non calcareous; abrupt smooth boundary.
30-85	Dark yellowish brown (10YR4/6) medium sandy loam no mottles; very slightly stony (2% small subangular sandstones); moist; very weakly developed medium subangular blocky structure; very friable; very porous (>15%, 70.5mm); common fine fibrous roots; non sticky; non plastic; non calcareous; clear smooth boundary.
85+	Medium soft sandstone

Table 3 Heavy textured clay soil, T3/S3

Profile Pit 3 (near auger boring 58)

Slope:- 1°E
Land Use:- Arable
Weather:- Dry after wet period

Depth cm	Horizon	Description
0-25		Dark grey (10YR4/1) medium clay loam. Common distinct light yellowish brown (10YR6/4) mottles; very slightly stony (2-3% small subangular sandstones); moist; weakly developed coarse subangular to angular blocky structure; firm soil strength; slightly porous; common fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
25-35		Greyish brown (2.5YR5/2) medium clay loam; common indistinct brownish yellow (10YR6/6) mottles; very slightly stony (2-3% small subrounded shales); moist; weakly developed medium to coarse angular blocky structure; firm soil strength; slightly porous (>0.5% >0.5mm); few fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear wavy boundary.
35-100		Grey (10YR6/1) clay; common distinct brownish yellow (10YR6/8) mottles; very slightly stony (5% small subrounded shales); moist; moderately developed medium prismatic structure; firm soil strength; very slightly porous (<0.5% >0.5mm); few fine fibrous roots; moderately sticky; very plastic; non calcareous.

3. AGRICULTURAL LAND CLASSIFICATION

The ALC grades occurring on this site are as follows:-

Grade/Subgrade	Hectares	Percentage of Total Area
1		
2	4.10	5.2
3a	16.22	20.5
3b	42.13	53.3
4		
5		
(Subtotal)	(62.45)	(79.0)
Urban	13.45	17.0
Non Agricultural	3.15	4.0
Woodland - Farm		
- Commercial		
Agricultural Buildings		
Open Water		
Land not surveyed	(16.60)	(21.0)
(Subtotal)		
TOTAL	79.05	100

3.1 Grade 2

Grade 2 land occurs as a narrow strip along the western edge of the site and in a small area in the centre, east of Elsicker Lane. Topsoils consist of medium clay loam and usually overlie similar permeable upper subsoils. In most places lower subsoils below about 60cm depth and formed of gleyed slowly permeable clay. Profiles are thus moderately well drained (Wetness Class II) and limited to Grade 2 only by slight winter wetness. In a few places where subsoils are formed of sandy loam droughtiness is the main limiting factor.

3.2 Sub Grade 3a

Land in this subgrade occurs to the north of Elsicker Lane and on the north eastern edge of the site. Soils generally consist of medium clay loam topsoils and gleyed but permeable upper subsoils which pass into slowly permeable clay lower subsoils. Most profiles are imperfectly drained (Wetness Class III) and limited to this subgrade by wetness and workability problems. Also included within the same areas of this subgrade are patches of lighter soil overlying sandstone where droughtiness is the main limitation.

3.3 Sub Grade 3b

This subgrade is widespread in the south eastern part of the site where land has been restored after coal extraction. Soils in this area are formed mainly of medium or heavy clay loam topsoils overlying compacted poorly structured clay subsoils. Overburden occurs commonly at a depth of about 50cm. Soils of this type are limited to Subgrade 3b by wetness the severity of which is increased by the compacted very slowly permeable nature of the subsoil. Elsewhere on the site, Subgrade 3b land consists either of heavy clayey soils limited by wetness and workability problems, or, on the higher ground above the sports field, thin soils over sandstone which are limited by droughtiness.

3.4 Urban

This consists mainly of the existing coal extraction site and associated haul roads.

3.5 Non-Agricultural

This includes the sportsground and small areas of woodland planted on the restored land.

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